DOCUMENT RESUME

ED 451 225 TM 032 453

AUTHOR	Batchelder, Michelle
TITLE	Austin Collaborative for Mathematics Education 1999-2000 Evaluation.
INSTITUTION	Austin Independent School District, TX. Office of Program Evaluation.
REPORT NO	AISD-OPE-99.14
PUB DATE	2001-01-00
NOTE	92p.; For the 1998-1999 annual report, see ED 442 805.
AVAILABLE FROM	Austin Independent School District, Department of Accountability, Office of Program Evaluation, 1111 W. Sixth Street, Austin, TX 78703.
PUB TYPE	Reports - Evaluative (142) -- Tests/Questionnaires (160)
EDRS PRICE	MF01/PC04 Plus Postage.
DESCRIPTORS	Educational Improvement; Elementary Education; *Elementary School Students; *Inservice Teacher Education; *Mathematics Education; *Middle School Students; Middle Schools; *Professional Development; Questionnaires
IDENTIFIERS	*Austin Independent School District TX

ABSTRACT

The Austin Collaborative for Mathematics Education (ACME) is a districtwide initiative to improve mathematics education in all elementary and middle school classrooms in the Austin Independent School District, Texas (AISD). The initiative, funded by the National Science Foundation and the school district, provides long-term, high-quality professional development to build the instructional capacity of more than 2,000 AISD mathematics teachers. This evaluation of ACME effectiveness was based on student mathematics test results from the Texas Assessment of Academic Skills (TAAS) and Iowa Tests of Basic Skills (ITBS); mathematics results; observations of 48 mathematics lessons and 7 professional development sessions; principal (n=88) and teacher (n=250) questionnaires, interviews with 10 teachers, AISD staff and administrators; and other AISD documents. As assessed by the ITBS, student basic mathematics knowledge has remained steady since the implementation of the ACME project. The percentage of students passing the TAAS rose from the 1998-1999 passing rates for most groups. Larger gains were seen for African American, Hispanic, and economically disadvantaged students even though those students continued to lag behind White students. ACME staff provided teachers with high quality, long-term professional development that was particularly effective in helping teachers who were not experienced with standards-based instruction learn how to use the designated curriculum resources. However, ACME professional development alone has not generally helped teachers who achieve a moderate level of competence become strong implementers of standards-based instruction. Recommendations are made for program improvement. Appendixes contain a discussion of gains and losses in TAAS mathematics scores, a chart of changes in professional development and implementation, and the evaluation instruments. (Contains 22 figures, 1 table, and 13 references.) (SLD)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 451 225

AUSTIN COLLABORATIVE FOR MATHEMATICS EDUCATION

1999-2000 Evaluation

Austin Collaborative
ACME
for Mathematics Education

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

M. Heuring

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Austin Independent School District
Office of Program Evaluation

January 2001

TM032453

BEST COPY AVAILABLE

***Austin Collaborative for Mathematics Education*, 1999-2000 Evaluation**
Austin Independent School District

Executive Summary

The *Austin Collaborative for Mathematics Education* (ACME) is a districtwide initiative to improve mathematics education in all elementary and middle school classrooms in the Austin Independent School District (AISD). This initiative, funded by the National Science Foundation (NSF) and the district, provides long-term, high quality professional development to build the instructional capacity of over 2000 AISD mathematics teachers. ACME professional development supports teachers as they implement the district's curriculum resources of *Investigations in Number, Data, and Space* and *Connected Mathematics (CMP)*, which are aligned with the state standards for mathematics education in the Texas Essential Knowledge and Skills (TEKS) and the national standards set by the National Council of Teachers of Mathematics (NCTM). These standards focus on broadening the topics taught at all grade levels, developing children's mathematical thinking, and deepening children's conceptual understanding through concrete experiences. The standards contrast with traditional mathematics education which is characterized by rote memorization and computation practice.

ACME professional development is designed to help teachers deepen their knowledge of mathematics content and standards-based pedagogy as well as to grow as a community of learners. Every elementary and middle school mathematics teacher, including general education, special education, and bilingual teachers, is expected to participate in two years of summer institutes and follow-up days during the academic year. To promote districtwide change, the ACME project focuses on the development of professional school cultures, administrative and teacher leadership, and community and parental involvement.

Major Findings

The evaluation of ACME effectiveness was based on student TAAS and ITBS mathematics results; observations of mathematics lessons and professional development sessions; principal and teacher questionnaires; interviews with teachers, ACME staff, and district administrators; and other AISD documents.

- The percentage of students passing the 1999-2000 TAAS mathematics rose from the 1998-1999 passing rates for most groups. African American, Hispanic, and economically disadvantaged students made larger gains than did White students, although the scores remained lower than the scores of White students.
- Strong implementation of standards-based mathematics instruction was related to the highest student TAAS mathematics passing rates, to the highest mean TLI scores (scaled scores to permit comparison across years and across grades), and to the highest passing rates for each of the 13 TAAS mathematics objectives. Standards-based mathematics instruction prepared students to pass the four problem-solving objectives particularly well. Students' problem-solving skills will be essential to passing future versions of TAAS.
- As assessed by the ITBS, student basic mathematics knowledge has remained steady since the implementation of the ACME project.
- ACME staff provided teachers high quality, long-term professional development. ACME professional development has been effective in helping teachers who are not experienced with standards-based instruction learn how to use the designated curriculum resources. However, ACME professional development alone has not generally helped teachers who achieve a moderate level of competence become strong implementers of standards-based instruction. The improvement of teachers' pedagogical skills and content knowledge was somewhat limited.

- Effective campus support for teacher implementation of standards-based mathematics (e.g., coaching that focuses on mathematics content, mentoring, and collaborative planning) is still in its infancy in AISD.
- Since the inception of the ACME project, changes in district, campus, and project leadership have yielded mixed messages, unclear vision, and wavering support for the implementation of standards-based mathematics at AISD. The AISD dual textbook adoption also sent mixed messages about district goals for mathematics education, although the focus on the state standards TEKS has redressed some confusion.
- Persistent concerns about students' passing the state assessment, TAAS, has continued to distract some teachers from implementing standards-based mathematics, despite strategies to address these concerns.

RECOMMENDATIONS

1. *Enlist district administrators to communicate a clear message about the district's vision for mathematics education because mixed messages have fostered piecemeal implementation of standards-based instruction across the district.* Broadcast the message on the AISD cable channel to reach teachers, campus administrators, parents, and community members. In area principal meetings, include 10 minute updates on the mathematics program (e.g., attendance at ACME professional development, TEKS and TAAS mathematics objectives, and the association between standards-based instruction and student achievement).
2. *Make explicit the connections between ACME and other district initiatives, especially IFL, because the approaches to teaching and learning are compatible.* IFL is an opportunity to strengthen the instructional leadership of district and campus administrators, which is a weak link in AISD's implementation of standards-based mathematics. Making the connections explicit should foster a shared vision for AISD's direction in curriculum and instruction and bolster necessary administrative support. If AISD is not able to bolster administrative support for standards-based mathematics instruction, it should look at other mathematics programs.
3. *Hire and train campus instructional specialists who are skilled in standards-based mathematics instruction through AFL funding.* Establish collaborative relationships between these specialists and ACME facilitators to provide a network of strong support for implementation on campuses. Concentrate this campus support on cognitive coaching and content-focused collaboration. By developing effective forms of campus support, AISD will help more teachers become strong implementers of standards-based mathematics instruction, which is linked to high levels of student achievement on TAAS mathematics (especially problem-solving skills that will be key to passing future versions of TAAS).
4. *Provide new ACME staff with professional development to maintain the quality of ACME professional development for teachers.* To ease the transition in ACME staff, develop cognitive coaching among team members and routinely examine teacher evaluations of ACME professional development to devise strategies to improve facilitators' skills.

TABLE OF CONTENTS

EXECUTIVE SUMMARY i

TABLE OF CONTENTS iii

LIST OF FIGURES v

LIST OF TABLES vi

PROJECT OVERVIEW 1

IMPACT ON STUDENT MATHEMATICS ACHIEVEMENT 5

Student Results and Teacher Implementation of Standards-Based Mathematics 5

District Mathematics Results 9

QUALITY OF ACME PROFESSIONAL DEVELOPMENT 19

Sources 19

ACME Professional Development Facilitators 19

Format of ACME Professional Development 20

Preparation of ACME Professional Development Facilitators 22

Culture of ACME Professional Development 23

Deepening Teachers' Understanding of Mathematics Content 25

Familiarizing Teachers with Curriculum Resources and Pedagogy 25

IMPACT OF ACME PROFESSIONAL DEVELOPMENT ON CLASSROOM INSTRUCTION 27

Classroom Observations in the Spring of 2000 27

Quality of Implementation in the Springs 1999 and 2000 28

ACME Participation and Quality of Implementation in the Spring 2000 29

Longitudinal Classroom Observations 30

Generalizations from Observers 32

Ongoing Support to Teachers Implementing Standards-Based Mathematics 32

Implementation of ACME Professional Development 33

SUPPORT FOR ACME REFORMS 34

Changes in Leadership 34

Support from Stakeholders 35

Consistency of District Initiatives *35*

Curriculum Resources *36*

Student Assessment *36*

INSTITUTIONALIZATION OF ACME REFORMS **37**

High Quality Professional Development *37*

Support for Standards-Based Mathematics Education *37*

SUMMARY AND RECOMMENDATIONS **39**

Strengths of ACME Project *39*

Adaptations to ACME Project *39*

Challenges of ACME Project *39*

Recommendations *40*

REFERENCES **41**

APPENDICES **43**

LIST OF FIGURES

FIGURE 1. PERCENTAGE OF STUDENTS PASSING TAAS MATHEMATICS BY QUALITY OF TEACHER IMPLEMENTATION IN SPRING OF 2000 7
FIGURE 2. MEAN TLI FOR STUDENTS IN TAAS MATHEMATICS BY QUALITY OF TEACHER IMPLEMENTATION IN SPRING OF 2000 8
FIGURE 3. PERCENTILE RANK OF STUDENTS TESTED IN ITBS MATHEMATICS BY QUALITY OF TEACHER IMPLEMENTATION IN SPRING OF 2000 9
FIGURE 4. PERCENTAGE OF STUDENTS IN GRADE 3 PASSING TAAS MATHEMATICS IN 1997-98, 1998-99, AND 1999-2000 11
FIGURE 5. MEAN TLI FOR STUDENTS IN GRADE 3 IN TAAS MATHEMATICS IN 1997-98, 1998-99, AND 1999-2000 11
FIGURE 6. PERCENTAGE OF STUDENTS IN GRADE 4 PASSING TAAS MATHEMATICS IN 1997-98, 1998-99, AND 1999-2000 12
FIGURE 7. MEAN TLI FOR STUDENTS IN GRADE 4 IN TAAS MATHEMATICS, 1997-98, 1998-99, AND 1999-2000 12
FIGURE 8. PERCENTAGE OF STUDENTS IN GRADE 5 PASSING TAAS MATHEMATICS IN 1997-98, 1998-99, AND 1999-2000 13
FIGURE 9. MEAN TLI FOR STUDENTS IN GRADE 5 IN TAAS MATHEMATICS IN 1997-98, 1998-99, AND 1999-2000 13
FIGURE 10. PERCENTAGE OF STUDENTS IN GRADE 6 PASSING TAAS MATHEMATICS IN 1997-98, 1998-99, AND 1999-2000 14
FIGURE 11. MEAN TLI FOR STUDENTS IN GRADE 6 IN TAAS MATHEMATICS IN 1997-98, 1998-99, AND 1999-2000 14
FIGURE 12. PERCENTAGE OF STUDENTS IN GRADE 7 PASSING TAAS MATHEMATICS IN 1997-98, 1998-99, AND 1999-2000 15
FIGURE 13. MEAN TLI FOR STUDENTS IN GRADE 7 IN TAAS MATHEMATICS IN 1997-98, 1998-99, AND 1999-2000 15
FIGURE 14. PERCENTAGE OF STUDENTS IN GRADE 8 PASSING TAAS MATHEMATICS IN 1997-98, 1998-99, AND 1999-2000 16
FIGURE 15. MEAN TLI FOR STUDENTS IN GRADE 8 IN TAAS MATHEMATICS IN 1997-98, 1998-99, AND 1999-2000 16
FIGURE 16. PERCENTILE RANK OF STUDENTS TESTED IN ITBS MATHEMATICS, 1997-98, 1998-99, 1999-2000 17
FIGURE 17. FREQUENCIES OF OBSERVATION RATINGS OF THE QUALITY OF TEACHER IMPLEMENTATION FOR THE SPRINGS OF 1999 AND 2000 28
FIGURE 18. PERCENTAGE OF OBSERVATION RATINGS OF THE QUALITY OF TEACHER IMPLEMENTATION BY ACME PROFESSIONAL DEVELOPMENT DAYS IN THE SPRING OF 2000 29
FIGURE 19. PROPORTION OF OBSERVATION RATINGS THAT ADVANCED, REGRESSED, OR DID NOT CHANGE IN QUALITY OF TEACHER IMPLEMENTATION 30
FIGURE 21. GAINS AND LOSSES IN PERCENTAGE OF STUDENTS PASSING TAAS MATHEMATICS BETWEEN 1998-99 AND 1999-2000 45
FIGURE 22. GAINS AND LOSSES IN MEAN TLI FOR STUDENTS IN TAAS MATHEMATICS BETWEEN 1998-99 AND 1999-2000 45

LIST OF TABLES

TABLE 1. FREQUENCIES OF CHANGES IN THE NUMBER OF PROFESSIONAL DEVELOPMENT DAYS BY CHANGES IN OBSERVATION RATINGS FROM SPRING OF 1999 TO SPRING OF 2000. 46

8

PROJECT OVERVIEW

In August of 1997, the Austin Independent School District (AISD) launched the Austin Collaborative for Mathematics Education (ACME) initiative to improve mathematics education in all elementary and middle school classrooms using standards-based curriculum resources and instruction. The National Science Foundation (NSF) and AISD funded the initiative, which is a collaborative with the Charles A. Dana Center and the University of Texas at Austin. In the 1998-99 school year, the ACME project served over 2000 AISD educators who teach about 55,000 students at 71 elementary and 17 middle schools in a district of approximately 77,000 students (46% Hispanic, 17% African American, 35% Anglo and 2% other; AISD Office of Student Services, Sept. 2000). The ACME project is unique because it serves every elementary and middle school mathematics teacher in a large urban district with long-term professional development.

The ACME project builds the instructional capacity of all mathematics teachers by providing a minimum of 120 hours of professional development through summer institutes and follow-up sessions. Some teachers also participate in campus level support, such as lesson modeling and collaborative planning. The intent of ACME professional development is to build teachers' capacity to deliver effective mathematics instruction to all students, to ensure consistent implementation of quality mathematics curriculum resources across the district, and to provide ongoing support for teachers and administrators as they implement standards-based curriculum and instruction. Specifically, district staff design ACME professional development to help teachers grow as a community of learners and to deepen their knowledge of mathematics content, pedagogy, and classroom management for inquiry-based mathematics instruction.

ACME provides every elementary and middle school mathematics teacher, including general education, special education, bilingual, and English as a Second Language (ESL) teachers, the opportunity to participate in a series of professional development activities lasting two years. Participants begin their training with a summer institute lasting two weeks and continue with four to five follow-up days during the academic year. The second year involves a three-day summer institute and three to four follow-up days. Teachers are paid a stipend to attend the summer institutes and follow-up sessions outside school hours, and substitutes are provided to release teachers during the academic year.

ACME professional development began working with teachers at the transition between elementary and middle school so that students would have consistent mathematics instruction from one year to the next. In the summer of 1997, fifth and sixth grade teachers began ACME professional development, followed by fourth and seventh grade teachers in the summer of 1998, second, third, and eighth grade teachers in the summer of 1999. Most kindergarten and first grade teachers began ACME professional development in the summer of 2000. Some kindergarten and first grade teachers, who were not yet targeted for implementation, chose to attend two days of professional development during the 1999-2000 school year because the district adopted the standards-based texts in the spring of 1999.

To accommodate the needs of AISD teachers and administrators, ACME staff adjusted the original design of ACME by adding professional development sessions on Saturdays and evenings, designing sessions for special education teachers, and adding overviews for late hires. To address

teacher turn-over (more than 500 new hires yearly), ACME staff continued to offer summer institutes and follow-up for teachers new to the district or who had not yet participated.

At most schools in the district, AISD implemented ACME professional development by grade levels. Yet, at eight pilot elementary schools, teachers of all grade levels participated in ACME professional development simultaneously. Three pilot middle schools participated in the NSF-funded State Systemic Initiative (SSI) beginning with sixth grade mathematics teachers in the summer of 1996. Pilot schools received modified summer institutes: fewer days of summer institutes and follow-up sessions, in exchange for campus support such as modeling lessons and conversations about curriculum and instruction. In the 1999-2000 school year, ACME staff continued to work with one pilot school that requested ongoing support.

The district supplies rigorous curriculum resources to support the mathematics instructional capacity of teachers as part of the ACME initiative. The resources are based on standards set by the National Council of Teachers of Mathematics (NCTM, 1989, 1991, 1995), by the state in the Texas Essential Knowledge and Skills (TEKS), and by AISD's Mathematics Department in the local curriculum document. In the spring of 1999, the district adopted the curriculum resources of *Investigations in Number, Data, and Space* for elementary grades and *Connected Mathematics* (*CMP*) for middle grades, and purchased these materials to support teachers' implementation of standards-based instruction. AISD also adopted the resources of *Math in My World* (English version)/ *Mathematicas in Mi Mundo* (Spanish version) for elementary grades and *Mathematics: Applications and Connections, Courses 1-3* (English version)/ *Mathematicas: Aplicaciones y Coneciones, Cursos 1-3* (Spanish version) to supplement TEKS areas not addressed in *Investigations* and *CMP*. This adoption ensures that all of AISD's mathematics education resources and efforts are consistent with local, state, and national standards.

The curriculum resources of *Investigations* and *CMP* are well suited for the ACME initiative compared to traditional textbooks because they support the following teaching practices:

- Promoting children's mathematical thinking, reasoning, and problem-solving skills;
- Developing children's deep understanding of mathematical concepts through concrete experiences, real-world problems, and communication; and
- Supporting a vertically and horizontally coordinated curriculum that addresses the needs of all students, including those who are served by the special education, bilingual, and gifted and talented programs (Russell, 1998).

These practices emphasize children's mathematical literacy by promoting the understanding of mathematics concepts and approach instruction through problem-solving and communication of ideas. These practices contrast with traditional practices that emphasize mathematical algorithms, rote memorization, and computation mastery (Cohen & Ball, 1990).

To promote districtwide change in mathematics education, the ACME project bolsters leadership and the development of school cultures in which communities continually improve mathematics teaching and learning. ACME staff provide institutes for campus administrators to build knowledge of standards-based mathematics curriculum resources and instruction and to help campus leaders develop strategies for supporting teachers in implementation. ACME staff also work with other organizational structures in AISD that promote teacher leadership (e.g., curriculum specialists) to support the continuous improvement of mathematics education on campuses. In addition, the ACME project has customized professional development for teacher leaders so that they

may facilitate sessions and support their peers at the campus level in a variety of ways, including peer coaching, demonstration teaching, and information sharing. To garner parent participation in the mathematics curriculum, the project staff provides schools with deliverables (e.g., pamphlets and videos in English and Spanish) as well as assistance with organizing parent education and involvement (e.g., parent math nights). Additionally, the project staff enlists program support from AISD's administrative leaders.

IMPACT ON STUDENT MATHEMATICS ACHIEVEMENT

The impact of the ACME project on student mathematics achievement is central to evaluating its effectiveness. While ACME activities focus on intensive professional development for teachers, improving student learning is a major goal of ACME.

STUDENT RESULTS AND TEACHER IMPLEMENTATION OF STANDARDS-BASED MATHEMATICS

To examine the direct effects of curriculum and instruction on student mathematics achievement, associations between the quality of teacher implementation of standards-based mathematics and student scores on the Texas Assessment of Academic Skills (TAAS) and the Iowa Test of Basic Skills (ITBS) were analyzed.

Classroom Observations and the Quality of Implementation

In the spring of 2000, evaluators observed the mathematics lessons of 48 teachers, including teachers in 10 bilingual and three special education classrooms. Forty of the 48 teachers were first randomly selected and observed in the spring of 1998 or in the spring of 1999; eight additional teachers were randomly drawn in the spring of 2000. AISD evaluators and Dana Center staff were trained and certified to reliably rate the quality of implementation of standards-based mathematics education on an 8-point ordinal scale using the HRI Classroom Observation Protocol (HRI, 1999a; see Appendix C). Most of the classroom observations (over 90%) were in elementary classrooms because the sampling frame of all AISD mathematics teachers includes more elementary school teachers than middle school teachers.

The quality of implementation of standards-based mathematics was simplified to three categories: **Weak** implementation, **moderate** implementation, and **strong** implementation. Observers discussed the concepts underlying the 8-point scale of the HRI protocol to determine the subcategories.

Weak implementation refers to lessons that show little evidence of standards-based instruction. Students passively received information from the teacher or were involved in activities that lacked purpose and were unlikely to enhance mathematical thinking. Moderate implementation occurred when observers found evidence of the beginning stages of standards-based teaching strategies that engaged students in problem-solving, but the quality of the lesson was limited. The lesson may have lacked teaching strategies that pushed students to deep understandings, or may have muddled conceptual knowledge with inaccurate or superficial exploration of mathematics content. Strong implementation refers to lessons that observers coded as effective and engaging standards-based instruction that helped most students successfully solve mathematical problems and developed conceptual understanding.

Student TAAS Mathematics Results

The TAAS is a state-mandated, criterion-referenced test. TAAS measures student mastery of the state standards TEKS in mathematics at grades 3 through 8 and at exit level. (Reading, writing, science, and social studies are also tested, but not all subjects are administered at all grade levels.)

The TAAS results are presented as the percentage of students passing, the percentage of students passing each of 13 mathematics objectives, and the mean (or average) Texas Learning Index (TLI). The TAAS mathematics objectives are divided into three domains: Objectives 1 through 5

are designed to assess Concepts; Objectives 6 through 9 assess Operations; and Objectives 10 through 13 assess Problem-Solving. The TLI is a scaled score that permits comparison across years and across grades. A TLI score of 70 is considered passing, and indicates that a student meets minimum expectations and is in line to meet the exit level standard if current progress continues.

Student TAAS Mathematics Results and the Quality of Teacher Implementation

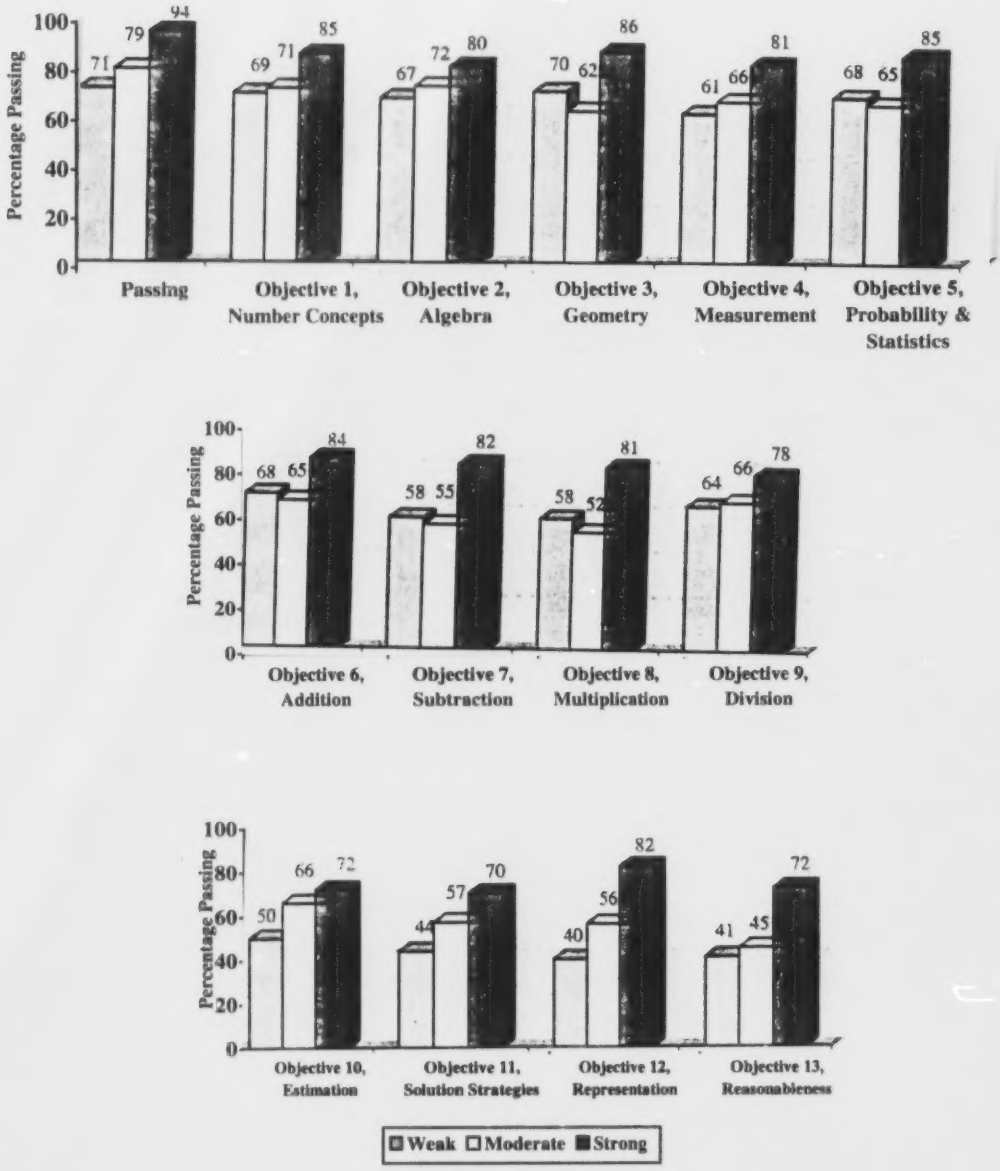
Student TAAS mathematics results were combined for the 30 classrooms out of the 48 observed in the spring of 2000, including bilingual and special education classes. The sample was limited to 30 classrooms because only grades 3 through 8 were tested on TAAS. Eleven of the lessons were rated as weak implementation, eight were rated as moderate implementation, and eleven were rated as strong implementation. The percentage of students receiving free and reduced-price lunch varied by teacher implementation: 60% in lessons rated as weak implementation; 55% in lessons rated as moderate implementation; and 40% in lessons rated as strong implementation.

Figure 1 presents the percentages of students passing the test and each objective, and Figure 2 presents the mean TLI in the observed classrooms by the quality of teacher implementation of standards-based mathematics.

The associations between student TAAS mathematics data and the quality of teacher implementation of standards-based mathematics suggest the following:

- Student mathematics achievement was higher in classrooms with strong implementation in all analyses than was student achievement in classrooms with weak and moderate implementation.
- Moderate implementation was associated with higher student achievement than was weak implementation in the Problem-Solving Domain, Objectives 10 through 13, and in Algebra and Measurement.
- Weak implementation was associated with higher student achievement than was moderate implementation in the Operations Domain, Objectives 6 through 9, and in Geometry.

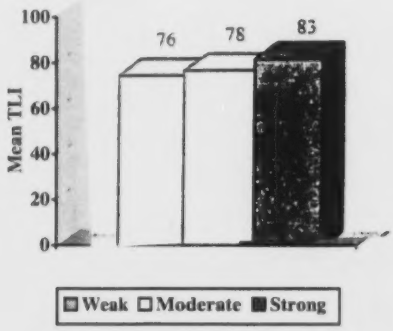
Figure 1. Percentage of Students Passing TAAS Mathematics by Quality of Teacher Implementation in Spring of 2000[1]



Note: For Objectives 1-8, the number of students in classrooms rated as weak implementation = 189; the number of students in classrooms rated as moderate implementation = 141; and the number of students in classrooms rated as strong implementation = 239. For Objectives 9-13, the numbers of students are smaller: TEA decided to collapse some TAAS Objectives for grades 3 and 4 due to limited exposure to some topics at those grade levels.

[1] Chi-square tests were statistically significant ($p < .01$) indicating that the number of students passing TAAS mathematics and passing each of the 13 objectives varied significantly by the quality of teacher implementation.

Figure 2. Mean TLI for Students in TAAS Mathematics by Quality of Teacher Implementation in Spring of 2000



Note: The number of students in classrooms rated as weak implementation = 189; the number of students in classrooms rated as moderate implementation = 141; and the number of students in classrooms rated as strong implementation = 239.

Student ITBS Mathematics Results

The ITBS is a norm-referenced test of general educational achievement that is administered to all AISD students at grades 3, 5, and 8 only. The ITBS assesses a wide range of skills including higher-order thinking skills, interpretation, classification, comparison, analysis, and inference. AISD students were administered two of three ITBS mathematics subtests: Concepts and Estimation, Problem-Solving and Data Interpretation, but not Computation. The ITBS results are presented as percentile ranks of the average standard score. A percentile rank of 50 indicates that 50% of all students who took the test nationally scored below that score.

Student ITBS Mathematics Results and the Quality of Teacher Implementation

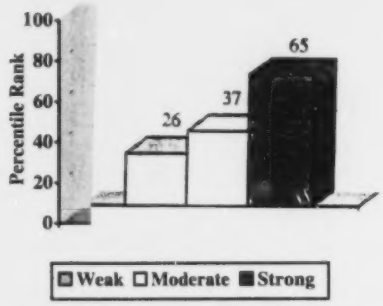
Student ITBS mathematics results were combined for 15 classrooms of the 48 observed in the Spring of 2000, including bilingual and special education classes. The sample was limited to 15 classrooms because only students in grades 3, 5, and 8, were tested on ITBS.

The ITBS results are presented as the percentile rank of the average standard score. Figure 3 presents the percentile rank for the students who were tested and enrolled in the observed classrooms in the Spring of 2000.

The association between student ITBS mathematics data and the quality of teacher implementation of standards-based mathematics suggests the following:

- Student mathematics achievement was associated with the quality of implementation.
- Students in classrooms with strong implementation scored higher than students in classrooms with moderate or weak implementation.

Figure 3. Percentile Rank of Students Tested in ITBS Mathematics by Quality of Teacher Implementation in Spring of 2000



Note: The number of students in classrooms rated as weak implementation = 48; the number of students in classrooms rated as moderate implementation = 37; and the number of students in classrooms rated as strong implementation = 67.

DISTRICT MATHEMATICS RESULTS

District TAAS Mathematics Results

To examine the global impact of the ACME project on AISD student mathematics achievement, district Texas Assessment of Academic Skills (TAAS) mathematics results are presented. The results for all AISD students tested were taken from the Texas Education Agency (TEA) Summary Reports for this evaluation. The data include scores of students who took the English version of the test, not the Spanish version; students in year-round schools; and students enrolled in special education classes, except in the 1997-1998 school year.

TAAS mathematics results are presented by grade and by disaggregated accountability student groups for the 1997-98, 1998-99, and 1999-2000 school years. The results for students in grades 3 through 8 are included because these grade levels are targeted by ACME. (Kindergarten through grade 2, although targeted by ACME, however are not tested with TAAS.) The results are presented by disaggregated groups; the groups are African American, Hispanic, White, and economically disadvantaged students. TEA differentiates student performance by these groups to hold districts and campuses accountable for the achievement of all students on all campuses.

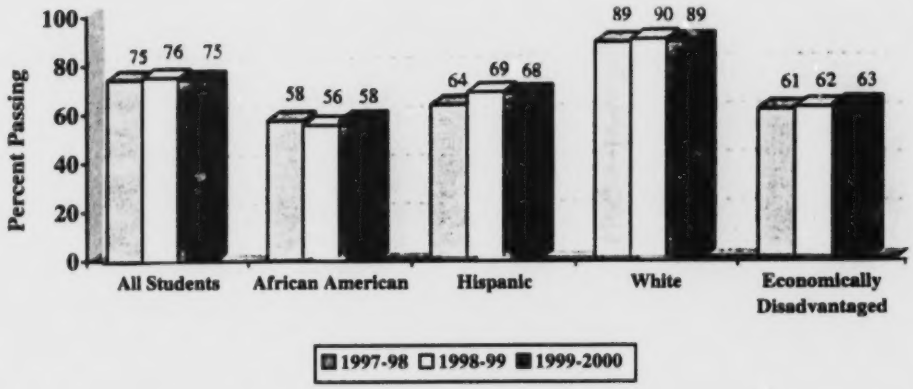
The TAAS results are presented in two ways: (1) the percentage of students passing (i.e., a TLI score of 70 or above) and (2) the mean TLI (see explanation, "Student TAAS Mathematics Results," p. **4**). Figures 4 through 15 present the percentages passing TAAS mathematics and the mean TLI for grades 3 through 8 and disaggregated groups in 1997-98, 1998-99, and 1999-2000. The number of years of implementation of standards-based mathematics varied by grade level. By the 1999-2000 school year, teachers in grades 5 and 6 had been implementing for three years, teachers in grades 4 and 7 had been implementing for two years, and teachers in grades 3 and 8 had been implementing for one year.

It is important to note that the influence of standards-based curriculum and instruction on the district TAAS and ITBS mathematics results is confounded by observed lessons that were supplemented with materials that were neither standards-based nor recommended by the district's Mathematics Department.

AISD student performance on the 1999-2000 TAAS mathematics in comparison with the 1998-99 results suggest the following observations:

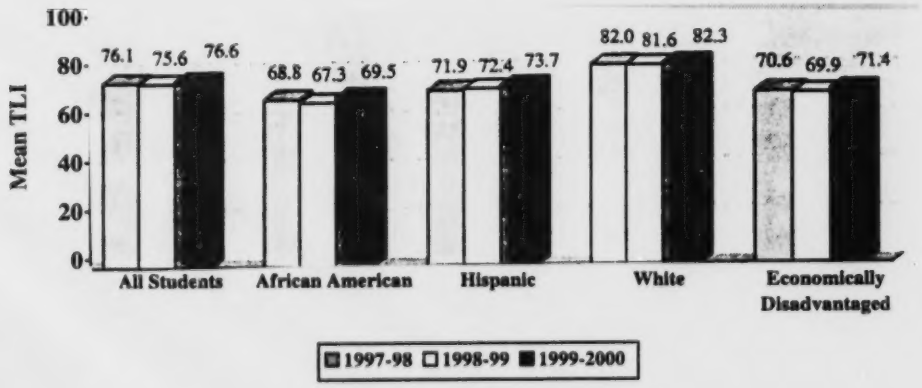
- The percentage of students passing TAAS mathematics increased for the majority of student groups, except for students in grade 3, even though students served by special education are included in the results after 1997-98.
- The mean TLI in mathematics increased for nearly every group across all grade levels.
- African American, Hispanic, and economically disadvantaged students made larger gains in mean TLI and in passing rates than White students (see Appendix A for gains and losses by disaggregated groups), although the results of African American, Hispanic, and economically disadvantaged students continued to be lower than the scores of White students.
- Middle school students made larger gains in mean TLI and in passing rates than did elementary students.
- Cohort analysis suggests that achievement gains made in grades 7 and 8 may be attributable to three years of standards-based mathematics instruction and ACME.

Figure 4. Percentage of Students in Grade 3 Passing TAAS Mathematics in 1997-98, 1998-99, and 1999-2000



Note: The data for the 1997-98 school year did not include students in special education. The number of students each year were: 1997-98, n = 4488; 1998-99, n = 4995; and 1999-2000, n = 4867.

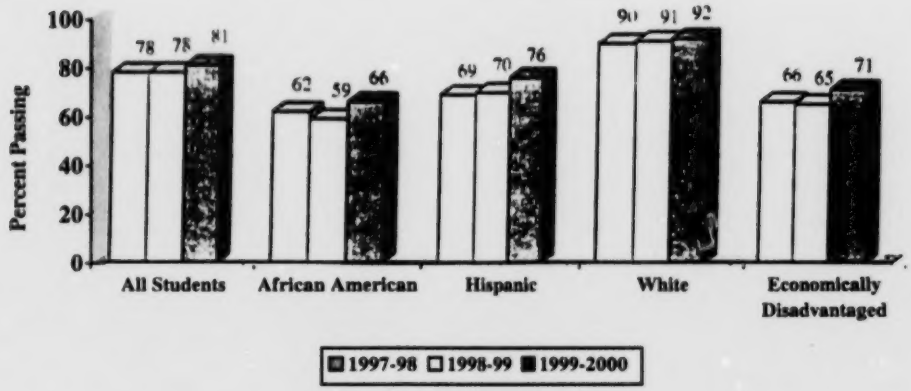
Figure 5. Mean TLI for Students in Grade 3 in TAAS Mathematics in 1997-98, 1998-99, and 1999-2000



Note: The data for the 1997-98 school year did not include students in special education. The number of students each year were: 1997-98, n = 4488; 1998-99, n = 4995; and 1999-2000 n = 4867.

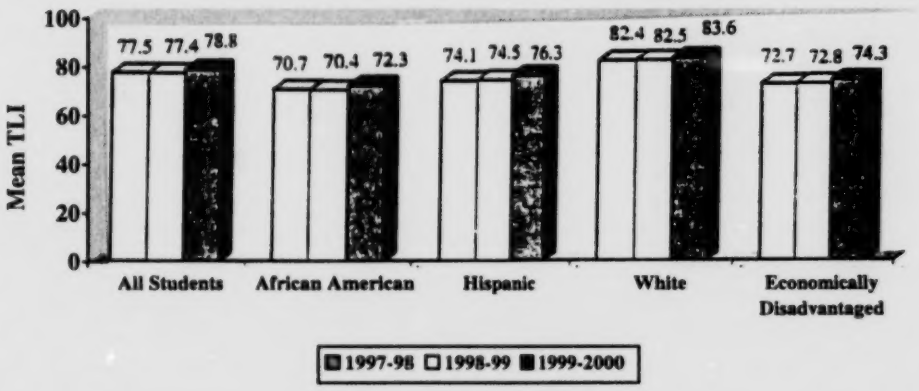
BEST COPY AVAILABLE

Figure 6. Percentage of Students in Grade 4 Passing TAAS Mathematics in 1997-98, 1998-99, and 1999-2000



Note: The data for the 1997-98 school year did not include students in special education. The number of students each year were: 1997-98, n = 4540; 1998-99, n = 4936; and 1999-2000, n = 5058.

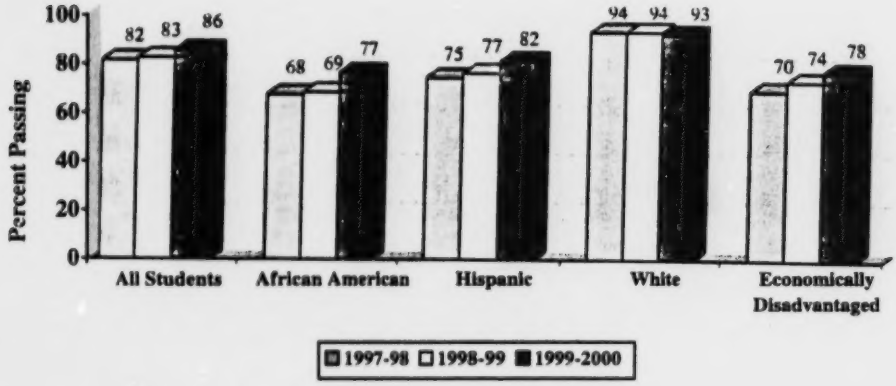
Figure 7. Mean TLI for Students in Grade 4 in TAAS Mathematics, 1997-98, 1998-99, and 1999-2000



Note: The data for the 1997-98 school year did not include students in special education. The number of students each year were: 1997-98, n = 4540; 1998-99, n = 4936; and 1999-2000, n = 5058.

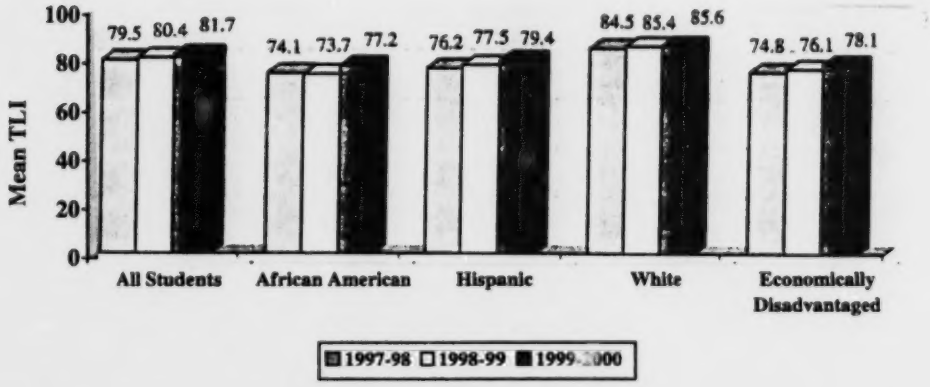
BEST COPY AVAILABLE

Figure 8. Percentage of Students in Grade 5 Passing TAAS Mathematics in 1997-98, 1998-99, and 1999-2000



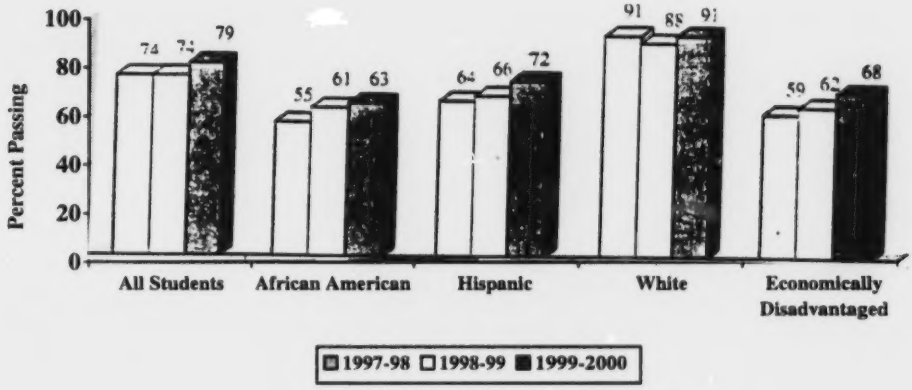
Note: The data for the 1997-98 school year did not include students in special education. The number of students each year were: 1997-98, n = 4416; 1998-99, n = 5102; and 1999-2000, n = 4797.

Figure 9. Mean TLI for Students in Grade 5 in TAAS Mathematics in 1997-98, 1998-99, and 1999-2000



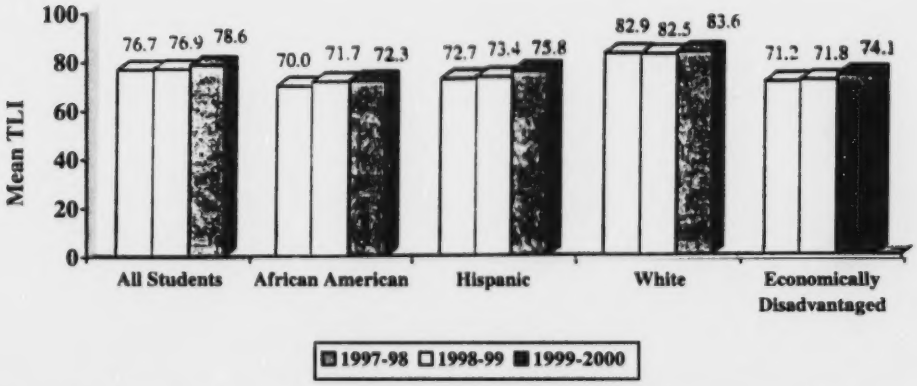
Note: The data for the 1997-98 school year did not include students in special education. The number of students each year were: 1997-98, n = 4416; 1998-99, n = 5102; and 1999-2000, n = 4797.

Figure 10. Percentage of Students in Grade 6 Passing TAAS Mathematics in 1997-98, 1998-99, and 1999-2000



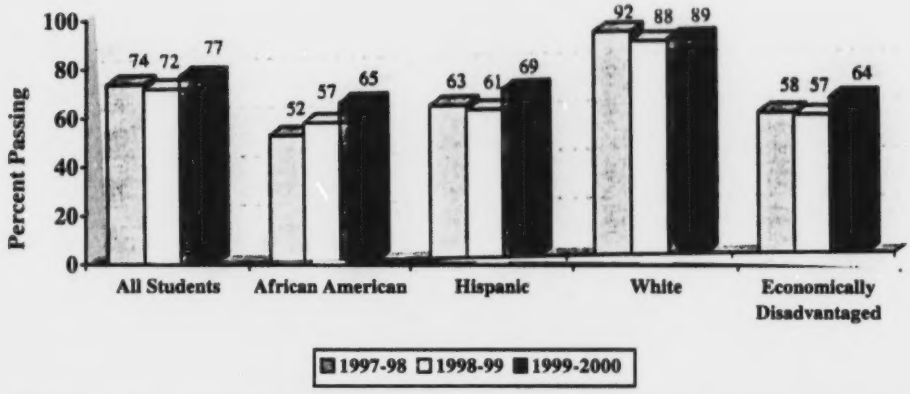
Note: The data for the 1997-98 school year did not include students in special education. The number of students each year were: 1997-98, n = 4202; 1998-99, n = 4738; and 1999-2000, n = 4894.

Figure 11. Mean TLI for Students in Grade 6 in TAAS Mathematics in 1997-98, 1998-99, and 1999-2000



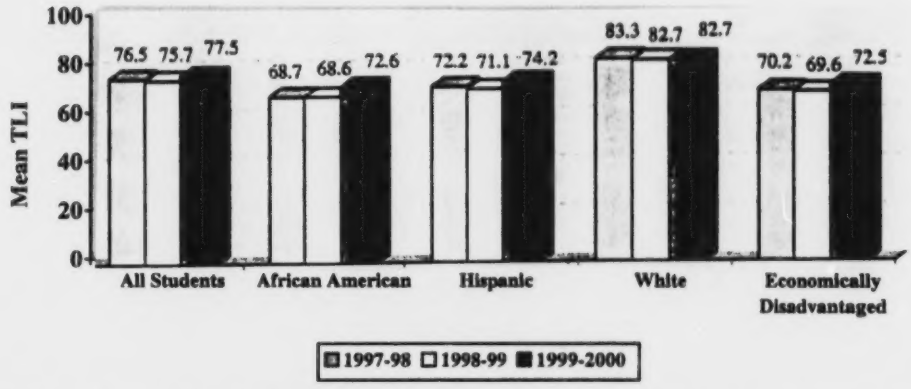
Note: The data for the 1997-98 school year did not include students in special education. The number of students each year were: 1997-98, n = 4202; 1998-99, n = 4738; and 1999-2000, n = 4894.

Figure 12. Percentage of Students in Grade 7 Passing TAAS Mathematics in 1997-98, 1998-99, and 1999-2000



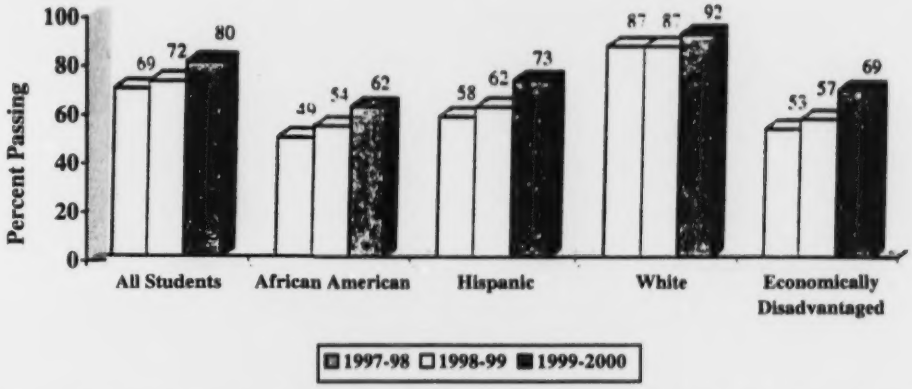
Note: The data for the 1997-98 school year did not include students in special education. The number of students each year were: 1997-98, n = 4286; 1998-99, n = 4623; 1999-2000, n = 4621.

Figure 13. Mean TLI for Students in Grade 7 in TAAS Mathematics in 1997-98, 1998-99, and 1999-2000



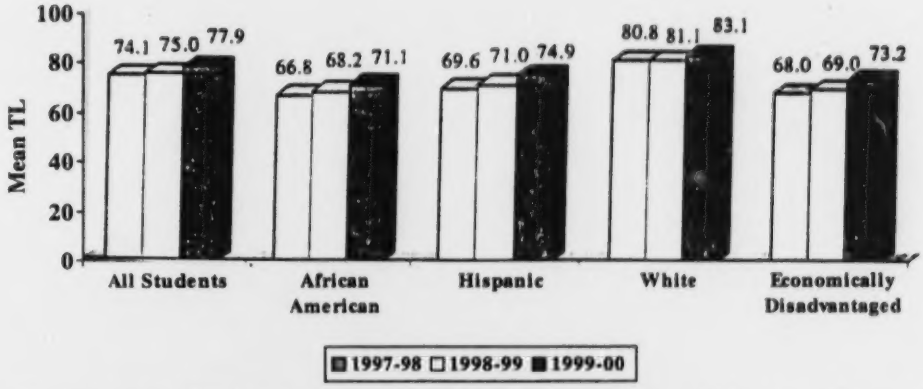
Note: The data for the 1997-98 school year did not include students in special education. The number of students each year were: 1997-98, n = 4286; 1998-99, n = 4623; 1999-2000, n = 4621.

Figure 14. Percentage of Students in Grade 8 Passing TAAS Mathematics in 1997-98, 1998-99, and 1999-2000



Note: The data for the 1997-98 school year did not include students in special education. The number of students each year were: 1997-98, $n = 4156$; 1998-99, $n = 4654$; 1999-2000, $n = 4466$.

Figure 15. Mean TLI for Students in Grade 8 in TAAS Mathematics in 1997-98, 1998-99, and 1999-2000



Note: The data for the 1997-98 school year did not include students in special education. The number of students each year were: 1997-98, $n = 4156$; 1998-99, $n = 4654$; 1999-2000, $n = 4466$.

District ITBS Mathematics Results

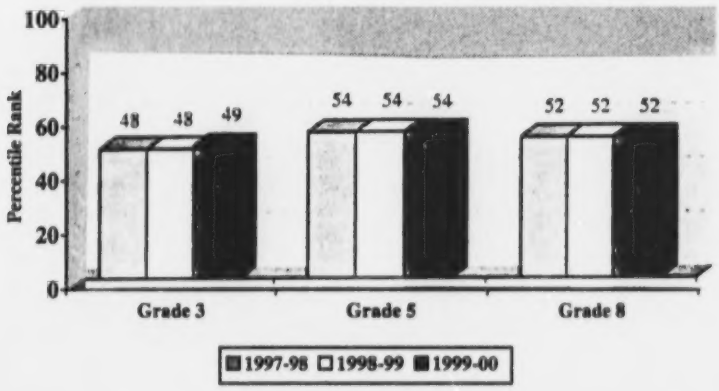
An argument against standards-based instruction is that students' mathematics achievement will decline because the emphasis on problem-solving may not provide opportunities to learn mathematics facts. TAAS measures students' knowledge of the state standards TEKS, which are consistent with the mathematical content and process standards of the AISD curriculum resources. To examine further the impact of the ACME project on students' mathematics achievement, district Iowa Tests of Basic Skills (ITBS) results are presented by grades tested for the three years of implementation of ACME. The ITBS is nationally-normed, assesses broader range of knowledge than TAAS, and allows for comparison with student scores nationwide.

The ITBS mathematics results for all AISD students enrolled at grades 3, 5, and 8 are analyzed in this report. Figure 16 presents the percentile rank (for explanation, see "Student ITBS Mathematics Results," p. 7) for the average performance of all AISD students in grades 3, 5, and 8 who took the test in the 1997-98, 1998-99, and 1999-2000 school years. Teachers in grade 5 were targeted for implementation of standards-based instruction for all of the three years presented, while teachers in grades 3 and 8 were targeted for implementation only in the 1999-2000 school year.

AISD student performance on the ITBS suggests the following observations:

- Mathematics achievement has remained steady since the inception of the ACME project.
- Grade level comparisons show that grade 3 has performed slightly below the national average, while grades 5 and 8 have performed slightly above the national average.
- Implementation of the ACME project appears to have neither helped nor hindered student achievement on the ITBS.

Figure 16. Percentile Rank of Students Tested in ITBS Mathematics, 1997-98, 1998-99, 1999-2000



Note: In 1997-98, Grade 3 (n=5363), Grade 5 (n=5716), and Grade 8 (n=5267); in 1998-99 Grade 3 (n=5634), Grade 5 (n=5859), and Grade 8 (n=4998); and in 1999-2000 Grade 3 (n=5634), Grade 5 (n=5540), and Grade 8 (n=5138).

QUALITY OF ACME PROFESSIONAL DEVELOPMENT

The key activity of the ACME project to improve mathematics instruction districtwide is intensive professional development for teachers. This section provides a description of ACME professional development and an analysis of the impact the project has had on mathematics teachers and standards-based instruction in AISD classrooms in the 1999-2000 school year.

SOURCES

Professional Development Observations

The information for this analysis came from several sources. The lead evaluator observed 7 ACME professional development sessions throughout the 1999-2000 school year, and formally rated five of these sessions on an 8-point scale using the HRI Professional Development Observation Protocol (HRI, 1999b; see Appendix C). Five were formally rated to meet NSF requirements, and additional sessions were informally observed to supplement the information.

Teacher Interviews

Ten randomly selected mathematics teachers, most of whom (8 of 10) had participated in 60 or more hours of ACME professional development, completed phone interviews. The interviews included questions about teachers' thoughts and feelings about ACME professional development, changes in practice, and school and district policies that facilitate or hinder reforms in mathematics education (see Appendix C).

Teacher Questionnaires

A random sample of 300 AISD elementary and middle school mathematics teachers were sent questionnaires, and 250 teachers of the 266 eligible returned valid questionnaires (return rate, 88%). One-third (34%) had taught school for 5 years or less, one-third (31%) had taught for 6 to 15 years, and one-third (34%) had taught for 16 years or more. The Local Systemic Change (LSC) Teacher Questionnaires surveyed teachers' beliefs about mathematics instruction, preparation, classroom practice, mathematics content knowledge, perceptions of district support, and experiences in ACME professional development (see Appendix C).

Principal Questionnaires

The 88 AISD middle schools and elementary principals completed LSC Prinicpal Questionnaires about standards-based mathematics and ACME professional development (see Appendix C).

Additional Sources

Additional sources of information included interviews with district and ACME project staff, observations of district and project meetings, district and state mathematics curriculum documents, professional development materials, brochures, letters, and newsletters.

ACME PROFESSIONAL DEVELOPMENT FACILITATORS

Composition of ACME Professional Development Team

In the third year of the project, the organization of ACME professional development facilitators was similar to that of the previous year. A core team of six ACME facilitators supported by the NSF grant provided the bulk of the ACME professional development and support to teachers.

Two district administrators and one district mathematics specialist supported the initiative by working with teachers and principals on campuses, by providing ACME professional development in the summer, and by observing the day to day realities of implementing the curriculum resources.

As in previous years, *CMP* facilitators from Michigan were hired to provide middle school summer institutes. Follow-up sessions during the academic year for middle school teachers were provided by one of the six ACME facilitators and a liaison with the Dana Center at the University of Texas.

A consultant with Marilyn Burns' *Math Solutions* provided additional professional development to a cadre of teachers and ACME staff as in the previous year. ACME staff invited teachers who appeared to be highly motivated to implement standards-based curriculum resources and expressed deep understanding of standards-based pedagogy to participate. The cadre was expanded from 40 teachers in the previous year to 80 teachers. In addition to elementary and middle school teachers, project staff added high school teachers. The cadre sessions focused on mathematical content knowledge (i.e., algebraic thinking, geometry, and vertical links from elementary content to calculus), spheres of influence for leading standards-based instruction, discourse in the classroom, and content-focused coaching. Several teachers who participated in the cadre helped provide professional development for summer institutes by modeling lessons and sharing their classroom experiences implementing the resources.

Changes in ACME Professional Development Team

At the beginning of the 1999-2000 school year, the ACME project lost a charismatic leader, an original designer and cheerleader for the grant, and has been struggling to recapture its original vigor. By the end of the summer of 2000, four ACME professional development facilitators had left the project for other positions because they were no longer wanted to work on the ACME team. Five new professional development facilitators were hired. Most of the new facilitators were participants in the ACME teacher cadre and teachers fresh out of the classroom. One new facilitator had extensive experience providing professional development and campus support with a New York Local Systemic Change (LSC) initiative. At the end of the school year, only one original member of the core ACME team remained, and many new members were still getting acclimated to the work.

In the summer of 2000, the district divided its mathematics curriculum team into secondary and elementary teams. The interim ACME project director, who had been a district mathematics specialist for three years, led the secondary team and a new leader was hired from outside the district to lead the elementary team and to supervise the ACME project.

FORMAT OF ACME PROFESSIONAL DEVELOPMENT

Design of Support for Teachers

ACME professional development for teachers consisted of weeklong summer institutes and follow-up days during the academic year. Follow-up days included sessions during school, after school, and on Saturdays. In the 1999-2000 school year, professional development was held at the district's Professional Development Academy (PDA) and at an additional site to meet the needs of teachers who live and work in north as well as in south Austin.

ACME professional development facilitators continued to integrate mathematics content knowledge, pedagogy, and the use of curriculum resources into the summer institutes and follow-up days as before. The ACME project did not hold separate sessions to focus on mathematics content

knowledge. Although a professional development session on cognitive coaching was offered for the first time in the fall of 1999, it was canceled because only two teachers in the district had registered.

Campus Support

Ongoing support to teachers implementing the curriculum resources generally took the form of follow-up days held at PDA. Few teachers received support on campuses. Several ACME professional development facilitators visited a handful of campuses, but the visits were short-term.

In the previous year, campus support was limited to teachers at several pilot schools (i.e., eight campuses that implemented standards-based curriculum and instruction in all grade levels simultaneously). In the 1999-2000 school year, campus support was the charge of two ACME facilitators. Each of the two facilitators selected five campuses to visit weekly for half a day. They met with second and third grade teachers who were in their first year of implementation of standards-based mathematics, about four teachers per campus. The two facilitators also visited 20 additional campuses on when requested.

To design a model of campus support, the two ACME facilitators collaborated with a colleague from a New York LSC and with ACME staff who had provided campus support with pilot schools the year before with the ACME evaluator. These facilitators selected several schools with low student passing rates on TAAS mathematics and schools whose teachers were highly engaged in the 1999 ACME summer institutes and showed motivation to implement standards-based curriculum and instruction. Included in the plan were strategies for establishing rapport with campus staff and guidelines for principals about the purpose of visits. These facilitators ended campus support in the fall because the ACME project needed staff to provide professional development sessions. Additionally, the ACME campus support facilitators perceived a lack of interest from teachers and administrators and found that visits lacked meaning (which ACME staff coined as the "parade wave"). They believed that developing trust was key to establishing a professional dialogue on campuses, which takes time, perhaps a year. One facilitator said, "To go into classrooms you need to build trust before you can begin talking. People who need help either don't know they need it or don't want it. It's like going into somebody's home."

Another ACME facilitator explored a model of campus support with one pilot school in which teachers and administrators wanted to continue professional development after completing the two years of summer institutes and follow-up days. The *"Collaborative Assessment"* model focused on improving instruction by examining student work and organizing content-focused conversations among colleagues. This approach appeared more effective than the one described in the previous paragraph because it focused discussion and reflection on student learning. It also reportedly refocused conversations in the teachers' lounge on teaching and learning mathematics. This focus on student learning also is a major goal of the Institute for Learning (IFL) a district initiative to improve leadership.

The differences in effectiveness of these two approaches to campus support centered on three elements: the school climate, the facilitator's skill level, and the model. When the school climate consisted of teachers and administrators who were knowledgeable about standards-based mathematics and motivated to improve instruction as in the case of the pilot school, the professional dialogue reached more campus staff than when the school climate was characterized by a lack of interest in changing instruction. The facilitator at the pilot school had honed her skills in guiding

teachers' conversations about student learning and professional development for several years, whereas the other facilitators were less skilled in supporting teachers. The model of campus support provided structured discussions of teaching and learning, whereas the model at other campuses focused on brief, superficial discussions about how implementation of standards-based mathematics instruction was progressing. Thus, in the 1999-2000 school year, effective campus support apparently occurred on one AISD campus.

In sum, developing campus cultures that provide ongoing support for teachers in their classroom, an original goal of the NSF grant, is still in its infancy. Campus support was not structured, rarely focused on mathematics content and pedagogy, and reached few teachers. Teachers' standing requests for observation and feedback were not systematically addressed. The ACME project offered to help teachers develop cognitive coaching relationships, but teachers did not appear ready for the opportunity. On the basis of a recent study of implementation of standards-based curriculum and instruction on AISD campuses (Batchelder & Christian, 1999), the synergism necessary for meaningful professional development to manifest on campuses is not yet common in the district.

PREPARATION OF ACME PROFESSIONAL DEVELOPMENT FACILITATORS

Orientation to ACME Professional Development

All professional development facilitators were former classroom teachers who were campus leaders in standards-based curriculum and instruction, and many had provided professional development for district, state, and national organizations. To orient new facilitators to the project in previous years, new members built on the expertise of established ACME facilitators by observing professional development sessions before facilitating their own sessions. However, in the 1999-2000 school year, orientation to the ACME project was skipped in part because most new facilitators learned about the project through the teacher cadre. New facilitators were assigned sessions, provided notebooks with professional development pieces, and received little guidance on the ACME approach to developing learning communities and to the needs of teachers. (In the fall of 2000, new professional development facilitators are again taking time to observe experienced ACME facilitators and become oriented to the project.) ACME facilitators continued to participate in national conferences for professional development such as the Technical Educational Research Center (TERC) leadership conference, "Administrators as Leaders, Parents as Partners," and the conference, "Diversity, Equity, and Standards, An Urban Agenda in Mathematics Education," sponsored by NSF, NCTM, and New York University. Additional professional development for ACME facilitators included "Effective Strategies for Engaging Teachers in Staff Development" and "Quality of Implementation of Standards-Based Instruction" provided by district staff.

Communication of ACME Professional Development Facilitators

In the third year of ACME, changes in central office and project leadership brought changes in how ACME facilitators worked together and communicated. Communication from district leaders and among ACME leaders was segregated from other ACME staff. Communication among ACME facilitators changed from a focus on improving ACME professional development to concerns about personal needs. For example, although lunch breaks previously were times for reflection and debriefing among ACME facilitators, in the summer of 2000 conversations focused on changes in district and uncertainty about the direction of ACME project organization. Thus, changes in the

district and the project had an impact on time spent reflecting and improving the effectiveness of ACME professional development.

Shared Vision of ACME Professional Development Facilitators

Many of the ACME professional development facilitators continued to hold a shared vision of the goals of the project: The vision, as one ACME facilitator reported, focused on improving mathematics instruction with "professional development at the center... for really getting teachers excited about teaching mathematics, empowering them to work as a team, and really learn how to implement the curriculum,... to get teachers to take over leadership roles, and to see the bigger picture." Yet, during the third year of the ACME project, talk that questioned the value of standards-based curriculum and instruction emerged among AISD mathematics specialists. In addition, rather than directly supporting standards-based mathematics instruction, district administrators emphasized teaching the curriculum embedded in the state standards TEKS, students' knowledge of which the TAAS assesses. Consideration of resources, other than *Investigations* and *CMP*, that prepared students for TAAS also surfaced. Although most ACME facilitators valued standards-based instruction to improve mathematics education, a shift in emphasis destabilized the vision.

CULTURE OF ACME PROFESSIONAL DEVELOPMENT

Development of a Learning Community

In the third year of the ACME project, the culture of ACME professional development focused on developing a learning community. To lay the groundwork for the learning community, ACME facilitators established norms on the basis of national standards for staff development and teacher feedback. These norms, posted and discussed at ACME professional development, included: (a) honor our time; (b) take responsibility for your learning and the learning of others; (c) focus on the purpose; and (d) keep student learning at the forefront. The goal was to make respect for colleagues explicit and to emphasize adult and student learning.

An introductory ACME professional development session for kindergarten and first grade teachers exemplified how the norms worked. The facilitator launched the session by starting on time stating, "I'm going to honor your time." Participants spent several minutes discussing the question, "Why do we come to professional development?" The facilitator commented that much of the discussion focused on the challenges of implementing the standards-based curriculum resources (e.g., reading the teacher books, organizing materials), but not on student thinking. This comment guided participants to turn to a discussion of student learning.

The facilitator, then asked for feedback on the discussion, which encouraged participants to reflect on the process of professional development and to be open about their reactions. One woman thought it was "helpful to realize that other people are going through the same things I am." After sharing stories about personal experiences learning mathematics, one woman stated "If a lot of the same things come up, you could just list it. It would take less time." Another woman responded, "This discussion reinforces my belief in a balance of manipulatives and drill." Thus, the facilitator guided teachers in sharing opinions that were supportive as well as oppositional to the professional development activities and to reform in mathematics instruction.

In ACME professional development, teachers and facilitators shared their struggles and insights about implementing standards-based mathematics in their classrooms. In a kindergarten and first grade summer institute, teachers and the facilitators participated in a book study of *Growing*

Mathematical Ideas in Kindergarten (Schulman-Dacey & Eston, 1999). One teacher expressed the challenges of changing teaching practices and said, "I have problems going from rote [instruction] to exploring deeper." The facilitator set the tone for reflection by conceding that questioning is "what's hard about *Investigations*." He figured out questioning strategies were "the reason my kids weren't making the 'Aha.'" He then tied that discovery to the participants' success in a problem-solving activity from that week of ACME professional development. He said, "This is the first time I felt the groups understood the 'Swimming Pool Problem,'" to which he attributed his development of effective questioning strategies.

Although most professional development facilitators focused on developing a learning community, the quality of facilitation varied across sessions, as was seen in previous years. In one observed ACME professional development session, for example, the facilitator directed the discussion in ways that seemed unresponsive to teachers' needs, which seemed to alienate some participants. Yet, despite or perhaps because of this apparent unresponsiveness, several teachers in the session added focus and leadership to the discussion by sharing their experiences implementing standards-based curriculum and their beliefs about reforming mathematics instruction. While variability in the quality of facilitation may hamper teachers' experiences in ACME professional development, some participants' motivation to implement standards-based mathematics may endure and influence others.

Levels of Engagement in ACME Professional Development Activities

In the third year of the ACME project, more teachers were observed to be actively engaged in professional development activities than before. However, in some observed sessions, 25% of the participants were not actively engaged (e.g., were discussing campus politics, grading papers) as in previous years. Some participants arrived in late (up to 30 minutes), as before, which was not consistent with commitment to the "honor our time" norm for professional development.

While some ACME facilitators employed effective strategies for engaging participants, others appeared to disregard the issue. Effective strategies included: (a) validating and giving voice to a variety of opinions by summarizing what participants said during break out sessions; (b) changing seating arrangements daily to mix participants from across the district; (c) using name sticks to draw out participants and to encourage every participant to be responsible for learning; and (d) talking to participants during breaks, including unfamiliar faces and quiet ones. Ineffective strategies included not talking to teachers that did not seem engaged and asking teachers to hold their comments without returning to the points later in a session. It appeared that making the norms explicit in dialogue with participants throughout sessions was more effective than simply posting the norms and presenting them once in a session.

Relevance of ACME Professional Development

Some lack of engagement in ACME professional development activities may be due to some teachers' not finding relevance in ACME professional development. In interviews, teachers expressed positive and negative beliefs about ACME professional development. As in the past, some teachers were impatient with the structure of sessions. One teacher reported that ACME professional development "could be faster; you do activities, and a lot of talking between is a waste of time; I'd like not to go." Other teachers wanted more time spent learning games of *Investigations*. One teacher said, "I would have spent more time on games and not put much theory into it, [I'd spend]

more time on individual book activities." Other teachers expressed positive experiences in ACME professional development. One teacher said, "It was really helpful to plan as a team.... Working with [an ACME facilitator] was more helpful than playing the games." Another teacher stated, "They're doing a good job, and they're good at answering people's questions.... I learn much more with *CMP* than kill kids with drill."

Although some teachers did not find activities of ACME professional development relevant, attitudes in general have remained lukewarm. On the basis of the LSC Teacher Questionnaire, over half of the teachers surveyed (57%) rated the quality of ACME professional development as "good," "very good," or "excellent," while less than one third of respondents (29%) rated it "fair," and a small proportion (14%) rated it "poor" or "very poor." The overall quality of rating of ACME professional development declined slightly in the Spring of 2000 from the Spring of 1999.

DEEPENING TEACHERS' UNDERSTANDING OF MATHEMATICS CONTENT

The ACME approach to deepening teachers' understanding of mathematics content continued in the project's third year as in previous years. Mathematics content was infused throughout ACME professional development. The approach included the following components:

- ACME facilitators presented engaging problems to provide opportunities for participants to explore mathematics deeply and to reflect on their experiences as adult learners and compare their experiences to those of students.
- ACME professional development activities asked teachers to examine children's mathematical thinking and problem solving strategies (e.g., videos presenting student strategies for solving multiplication and division problems and the derivation of what students need to know to solve these problems).
- While working with the curriculum resources, ACME professional development addressed a variety of content areas such as number sense, computation strategies, measurement, algebraic thinking, and geometry (e.g., how children learn to count from the *Investigations* Teacher Notes); probability and statistics were not covered.

Thus, placing student mathematical thinking at the forefront of professional development discussions was a focus of ACME professional development in the third year. Although this approach appeared to make mathematics content accessible to a number of teachers, for some teachers, gaining understanding was hit or miss. Not all content areas were explored thoroughly, nor was mathematics content differentiated for the needs of various teachers.

The informal assessment of how well teachers were learning mathematics content continued as before through informal conversations and observations during ACME professional development. On the basis of responses to the LSC Teacher Questionnaire, increases in how prepared teachers felt to teach mathematics content that had occurred in the second year of the ACME project had stabilized by the third year.

FAMILIARIZING TEACHERS WITH CURRICULUM RESOURCES AND PEDAGOGY

Curriculum Resources

The approach of ACME professional development to helping teachers become familiar with standards-based curriculum resources and pedagogy continued as in the previous year. The approach to familiarizing teachers with standards-based curriculum resources included:

- To begin, a scavenger hunt helped teachers discover parts of the curriculum resources.

- ACME professional development often asked participants to engage in activities with manipulatives, to play the games in the resources, and to explore the mathematics underlying the activities. In follow-up during the school year, professional development activities focused on books that teachers were scheduled to use in the coming months.
- Teachers shared classroom experiences with the resources in group and panel discussions, including information about how to organize materials and classroom management.
- Classroom teachers from the teacher cadre modeled lessons from *Investigations* and *CMP* and shared classroom experiences in summer institutes.
- To address the needs of diverse learners teachers discussed extensions and adaptations to activities, and the ACME project developed charts with extensions for gifted and talented, special education, and bilingual/ESL students.

Increasing Teachers' Standards-Based Pedagogical Knowledge

The approach to increasing teachers' knowledge of standards-based pedagogy included:

- ACME facilitators modeled inquiry-based pedagogy, pointed out the questions they asked to push participants' thinking to new levels, and asked teachers to discuss the strategies used to facilitate exploration of mathematics content and student thinking.
- Summer institutes included a book study of *Beyond Arithmetic* (1995) in which teachers reflected on inquiry-based pedagogy, student learning, and mathematics curriculum.
- Participants examined Bloom's taxonomy of learning and related it to the mathematics TEKS.
- ACME facilitators presented videos of AISD teachers implementing standards-based pedagogy and held discussions on teaching strategies and student dialogue.
- Second grade teachers who administered the Performance Assessment in Language Arts and Mathematics (PALM) and who were targeted for implementation of ACME curriculum resources scored their students' work with rubrics and discussed how describing the work could inform instruction. (Although kindergarten and first grade teachers also administered PALM, they were not targeted for implementation in the 1999-2000 school year.)
- Teachers also received an extensive set of handouts with questions to promote deep exploration of mathematics with students.

Observations of ACME professional development revealed variability in the depth of discussions and in putting into practice these approaches. While some ACME facilitators appeared to effectively engage participants and motivate deep exploration, other facilitators were not stimulating or attentive to best practices for staff development.

On the basis of the LSC Teacher Questionnaire, the teachers surveyed continued to endorse standards-based teaching strategies as in previous years. Yet, their level of endorsement increased in the previous year and stabilized in ACME's third year. Although the teachers surveyed continued to report that their pedagogical knowledge was higher than mathematics content knowledge, pedagogical knowledge had increased in the previous year and stabilized in the third year of the ACME project.

Professional Development Tailored to Special Education Teachers

To help special education teachers become familiar with standards-based curriculum resources and pedagogy, ACME professional development was expanded to include sessions tailored

to their needs. Special education teachers attended professional development on number sense in the fall and on operations in the spring, with primary and secondary teachers attending separately. A key feature of the session was a special education teacher who presented case studies recounting how she adapted one lesson to the unique learning styles of three children. The special education teachers who attended reported appreciation of the rare opportunity to get together and to talk about work.

IMPACT OF ACME PROFESSIONAL DEVELOPMENT ON CLASSROOM INSTRUCTION

CLASSROOM OBSERVATIONS IN THE SPRING OF 2000

Evidence of the impact of ACME professional development on instruction was derived from classroom observations (for a sample description, see "Classroom Observations and the Quality of Implementation," p. 13). These observations provided a small, representative sample of mathematics instruction in the district. Although a large number of the observations (69%) included the curriculum resources of *Investigations in Number, Data, and Space* and *Connected Mathematics* (*CMP*) that were selected for the ACME initiative, observers remarked that a few teachers may have chosen to use these materials only because an ACME evaluator was observing the lesson.

Many of the observed lessons included key elements of standards-based instruction such as problem-solving, communication, and using manipulatives for concrete representation, but a proportion of the observations involved rote activities such as drilling mathematics facts with flash cards. The observed lessons covered a variety of topics, including numeration and number theory, computation, patterns and relationships, and/or geometry. A majority of the lessons (67%) involved students as an entire classroom and/or individuals; thirty-eight percent involved students in small group activities. (Some lessons included more than one organizational structure.) Centers were used infrequently (19% of observations). The teachers' stated purpose for most of the observed lessons (60%) was to develop or review children's conceptual understanding, and the teachers intended students to learn mathematics facts in some lessons (23%). A majority of the observed lessons centered student activities on problem-solving (88%) and/or the use of manipulatives (54%). Classroom discussions occurred in many observations (42%), and in some lessons (25%) students answered textbook or worksheet questions. Computers, calculators, and audio-visual resources were used infrequently (21% of observations).

Definition of Rating Scale

The quality of implementation of standards-based instruction was rated using the Classroom Observation Protocol (HRI, 1999b), an 8-point global scale. Previous analyses simplified these ratings to three categories: weak, moderate, and strong implementation.[2] On the 8-point scale, level 1 refers to instruction that shows little evidence of student engagement with mathematical ideas. Level 1 has two subcategories. *Level 1A* involves passive learning in which raters observed the students receiving knowledge from the teacher or text. *Level 1B* refers to activity for activity's sake in which hands-on lessons lacked purpose or content. *Level 2* describes instruction that may have included

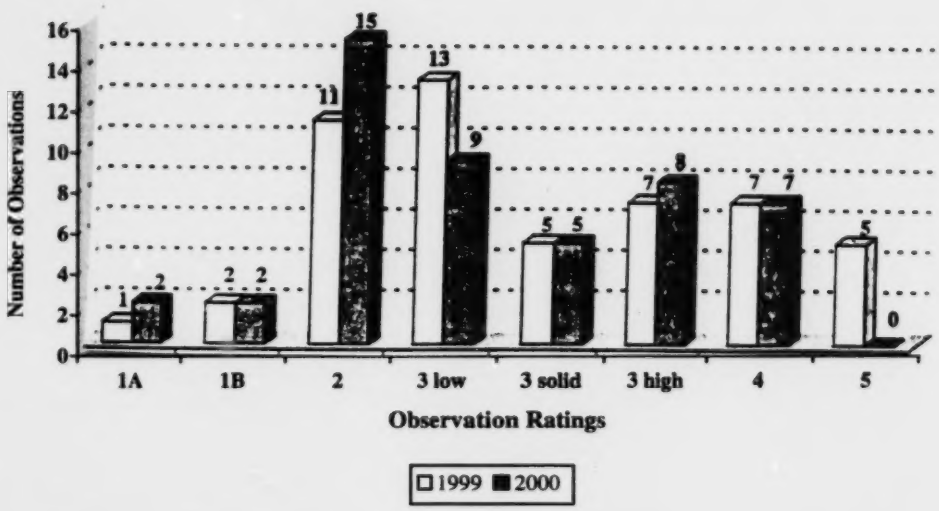
[2]Weak implementation includes levels 1A, 1B, and 2 of the HRI Classroom Observation Protocol; moderate includes levels 3 low and 3 solid; and strong includes levels 3 high, 4, and 5.

elements of standards-based strategies but observers coded the lesson as having substantial problems in design, implementation or content and was limited in the likelihood to enhance children's mathematical understanding. At *Level 3* observers coded instruction at the beginning stages of standards-based teaching strategies by engaging children in mathematical concepts and problem-solving but may not have reached some children. Level 3 is broken down into low, solid, and high. *Level 4* reflects standards-based instruction that was effective and engaging and appeared to help most students solve mathematical problems successfully. *Level 5* describes exemplary instruction that engaged all of the students most of the time in mathematical problem-solving, communication, and conceptual understanding and represented the art more than the craft of teaching.

QUALITY OF IMPLEMENTATION IN THE SPRINGS 1999 AND 2000

The observation ratings of the quality of implementation of standards-based mathematics instruction in the Springs of 1999 and 2000 were similar[3], although the 1999-2000 school year brought some decline (see Figure 17). In the Spring of 2000, more lessons were rated at level 2 and fewer lessons were rated at level 3 low than were in the Spring of 1999. In addition, no mathematics lesson in the Spring of 2000 was rated at level 5. These results suggest a slight shift in the district away from high quality standards-based instruction.

Figure 17. Frequencies of Observation Ratings of the Quality of Teacher Implementation for the Springs of 1999 and 2000



Source: Classroom Observations

It is important to interpret these results cautiously. Differences in longitudinal observation ratings may be due to the differences in raters from one year to the next. Two AISD evaluation staff rated classroom observations in the Spring of 1999, and were replaced in 2000 by raters who had strong mathematics content backgrounds and who may have rated lessons more stringently than the

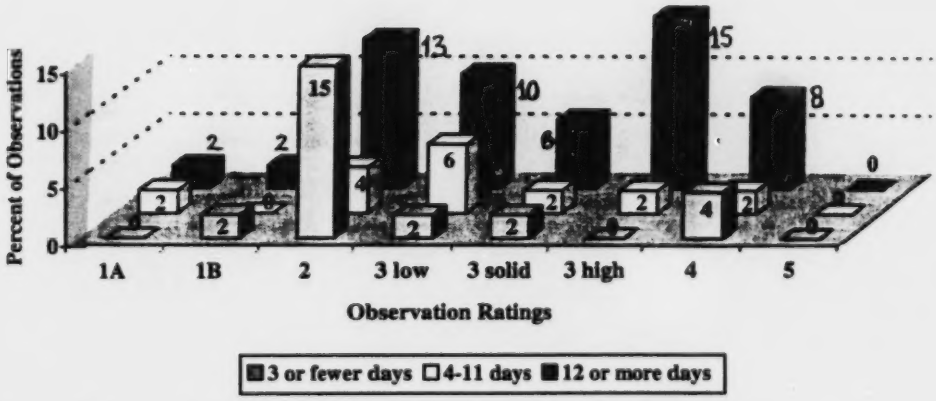
[3] Longitudinal observation ratings were correlated, $r(40) = .57$, $p < .001$.

observers in 1999[4]. In addition, Horizon Research, Inc. (HRI), subcontracted by NSF to design and direct the national evaluation of LSC initiatives, provided intensive training viewing and rating classroom videos for one and a half days. HRI certified raters as reliable if their ratings of a set of classroom videos fell within one level of the official NSF rating. Thus, differences across years could also be due to the inter-rater reliability criterion. Moreover, measuring a teacher's instruction on the basis of one observation per year is not reliable. An educational researcher postulated that frequent observation, about six ratings in one year, might provide reliable data of a teacher's instructional competence (Ball, 1999).

ACME PARTICIPATION AND QUALITY OF IMPLEMENTATION IN THE SPRING 2000

The time teachers spent in ACME professional development by the Spring of 2000 appeared to influence the quality of implementation of standards-based mathematics instruction (see Figure 18). The teachers observed in 56% of the 48 lessons had participated in 12 or more days of ACME professional development, and most of the ratings demonstrated moderate and strong levels of implementation of standards-based mathematics instruction (level 3 low and above). Nineteen percent of the teachers observed had participated in 4 to 11 days of ACME professional development, and the ratings centered around moderate levels of implementation of standards-based instruction (level 3 low). Twenty-five percent of the teachers observed had participated in 3 or fewer days of ACME professional development, and most of the ratings reflected weak levels of implementation (level 2 and below).

Figure 18. Percentage of Observation Ratings of the Quality of Teacher Implementation by ACME Professional Development Days in the Spring of 2000



Source: Classroom Observations

[4] One 1999 observer who did not observe in the Spring of 2000 tended to rate lessons 2.5 levels above the other 1999 observers, ANOVA, $F(5, 44) = 2.09$, $p = .09$.

BEST COPY AVAILABLE

Participation in ACME professional development appears to not be helping a number of teachers become competent at standards-based instruction, however. Twenty-three percent of the teachers whose lessons were rated as weak implementation (level 2 and below) had participated in a great deal of ACME professional development (4 or more days). These results are cause for concern. This finding may be due to ineffective professional development as well as teachers' unwillingness to change their practice. On the other hand, other systemic factors may influence these results such as lack of administrative support on campuses for implementation, little time during the school day for teacher collaboration focused on mathematics content knowledge and student learning, and AISD's lack of clear vision about mathematics education.

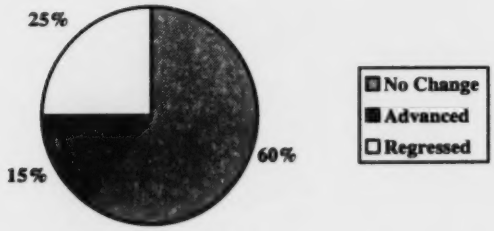
A few of the teachers observed (8%) had spent little time in ACME professional development but presented moderate or strong levels of implementation of standards-based instruction (level 3 low and above). As noted in a previous ACME evaluation (Batchelder & Christian, 1999), teachers who are "experts" in standards-based teaching practice are an untapped resource in AISD. These teachers could provide support such as mentoring or peer coaching on campuses.

LONGITUDINAL CLASSROOM OBSERVATIONS

Change in the Quality of Implementation of Standards-Based Instruction

The mathematics lessons of 40 teachers were observed longitudinally, once in either 1998 or 1999 and once in 2000. The pie chart (Figure 19) illustrates the percentage of the 40 rated lessons that "advanced," "regressed," and did not change ("no change") in quality of teacher implementation of standards-based mathematics (weak, moderate and strong implementation; see Appendix B for the changes in observation ratings). A majority of the mathematics lessons observed (60%) did not change in the quality of implementation of standards-based instruction, 25% of the observed lessons regressed, and only 15% of the observed lessons advanced.

Figure 19. Proportion of Observation Ratings that Advanced, Regressed, or Did Not Change in Quality of Teacher Implementation



Source: Classroom Observations

In general, the mathematics lessons of teachers whose ratings advanced by the Spring of 2000 were not implementing standards-based teaching strategies when they were first observed. The advanced group was rated significantly lower at the first observation on average than were the

regressed group or no change group[5]. The average first rating for the advanced group was level 2. At level 2, instruction focuses on practicing computation and does not appear to help children deepen their conceptual understanding of mathematics. The average first rating was level 3 solid for lessons that did not change and regressed. At level 3, instruction includes many components of effective standards-based instruction that help children develop conceptual understanding and solve complex mathematical problems.

It is important to note that the small proportion of teachers whose lessons advanced may have been affected by the number of teachers not continuing in the longitudinal study. Thirty-seven percent of the 63 teachers who were observed in either the Spring of 1998 or the Spring of 1999 did not participate in a second observation for various reasons (e.g., personal leave, not teaching mathematics, hired for other positions), and several teachers refused to continue. Additionally, the district has a teacher turnover rate between 15% and 20% per year, including retirees, recently certified teachers, and others. The teachers who did not continue to participate in the study in the Spring of 2000 tended to have a first observation rating that averaged one level below the rating of the teachers who participated longitudinally[6]. Because the average first observation rating of teachers whose lessons advanced was lower than the ratings of teachers whose lessons regressed or did not change, it is likely that if more teachers had continued the study, the size of the advanced group might be larger.

ACME Professional Development Participation and Change in the Quality of Implementation

The amount of participation in ACME professional development should relate to changes in the quality of the implementation of standards-based curriculum and instruction. However, the results were complex (see Appendix B, Table 1). Changes in observation ratings were not directly related to the number of ACME professional development hours attended for all of the teachers who participated in the longitudinal study.

Advanced ratings. Most of the teachers whose ratings advanced (5 of 6 observations) had participated in 4 or more days of ACME professional development in the last year. Participation appeared to help some teachers who lacked knowledge and skills in standards-based instruction begin to develop those teaching strategies.

No change ratings. Among the group whose ratings did not change, 46% (11 of 24 observations) had participated in little ACME professional development (i.e., 3 or fewer days) in the past year. Over half of the teachers whose ratings did not change (13 of 24 observations) had participated in a considerable amount of ACME professional development (i.e., 4 or more days) in the past year. Thus, for a number of teachers, ongoing participation in ACME professional development did not render major improvements in standards-based teaching practices.

Regressed ratings. Most of the teachers whose ratings regressed (7 of 10 observations) had participated in a considerable amount of ACME professional development (i.e., 4 to 11 days) in the past year. Thus, despite participating in ACME professional development during the 1999-2000 school year, some teachers did not maintain or advance to higher levels of competence in standards-based teaching strategies. Observers noted that some regression was due to teachers' decisions to

---

[5] One-way ANOVA, $F(2, 37) = 3.75$, $p < .05$.

[6] One-way ANOVA, $F(1, 61) = 3.43$, $p = .07$; the mean levels of first observations tended to be 3 low for teachers who left the study and 3 solid for teachers who participated longitudinally.

steer away from standards-based curriculum resources (e.g., by integrating mathematics and art or by drilling students with flash cards to control a class in which many students had disruptive behavior).

Caveats. The results of this longitudinal analysis should be considered cautiously. First, the observations reflect ratings of one day in an academic year, while many factors can influence the quality of instruction (e.g., mood, familiarity with the lesson, external events). Second, as noted above, the observers in 2000 may have rated lessons more stringently than the observers in 1999 and thus influenced the size of the regressed group. Additionally, observers noted that many observations took place after TAAS when instruction appeared to "shut down," and the quality of instruction was compromised. Although some teachers may have the capacity to implement standards-based instruction, which is linked to student mathematics achievement, they appear to abandon the curriculum after testing. Consequently, AISD students may loose three to four weeks of quality instruction and learning.

GENERALIZATIONS FROM OBSERVERS

The following generalizations of the observers inform these results:

- Although the district has adopted the curriculum resources of Investigations in Number, Data, and Space and Connected Mathematics (CMP) and the supplemental texts of Math in My World and Mathematics: Applications and Connections, Courses 1-3, teachers were observed routinely supplementing lessons with materials that were not standards-based (e.g., Excel worksheets and Arithmetic Done Daily, A.D.D.) to drill students for TAAS.
- Teachers did not seem to learn what makes lessons engaging from ACME professional development; they reduced lessons to the procedures and cut out rich activities in which students establish mathematical understandings.
- Teachers have not become skilled in teaching strategies that raise the quality of instruction (e.g., asking questions that challenge student thinking and wrapping up lessons with key concepts of lessons that reinforce student learning.)
- Teachers have not developed a complex understanding of mathematics content knowledge.
- The difference between lessons rated at accomplished levels of standards-based instruction and lessons rated as lacking standards-based instruction were teacher expectations and value for what students would learn from the lesson.

These generalizations support the conclusion that ACME professional development may help teachers who are not experienced with standards-based instruction learn how to use the high quality curriculum resources and develop some competence in the teaching strategies. Yet, teachers who develop a level of competence do not develop their skills further and become highly effective at standards-based instructional strategies. The ACME project has not yet helped a majority of AISD teachers gain the mathematics content knowledge and the pedagogical skills necessary to become highly effective at standards-based instruction.

ONGOING SUPPORT TO TEACHERS IMPLEMENTING STANDARDS-BASED MATHEMATICS

Materials for Campuses

Before the third year of ACME, the district had purchased curriculum resources for all grade levels implementing standards-based instruction (second through eighth grades) and kits for every two teachers implementing. In response to teacher feedback, the district supplied every teacher with

a kit. Additionally, the district provided packets of most student sheets for teachers implementing in the 1999-2000 school year to reduce teachers' photocopying load.

In the 1999-2000 school year, distribution of materials to teachers on campuses did not run smoothly. Materials for kindergarten and first grade teachers were not available from the publishers by the first day of classes in August. Although these grade levels were not yet targeted to implement the ACME-designated resources, the district adoption of *Investigations* required distribution. The student sheets were also copied and distributed to campuses for every classroom. The sheets were delivered a few weeks after school began. Additionally, keeping track of campus inventories with packing slips as well as with staff turnover continued to be problematic as in previous years.

Follow-up Support

Ongoing support to teachers implementing the curriculum resources generally took the form of follow-up days. As stated previously, on campus support was rare. As in previous years, some teachers found benefits in the ACME follow-up professional development during the academic year whereas others did not receive what they felt they needed. For example, one teacher valued working with the curriculum resources during follow-up professional development. She stated, "The follow-up training really shows you how you need to be teaching the materials; the facilitators point out difficulties and suggest different ways to approach the activities.... If you pick up a book without training, it's very difficult." Other teachers questioned the plan of ACME follow-up. One teacher stated, "In the follow-ups we didn't get into every book; it was rushed. I think the TAAS activities were not relevant." It appeared that teachers appreciated support using the materials during the academic year, but some disagree about how the time should be spent. While exploring the TAAS, TEKS, and links to standards-based resources allayed the concerns of some teachers, other did not see the relevance of these activities.

IMPLEMENTATION OF ACME PROFESSIONAL DEVELOPMENT

In the third year of the ACME project, implementation of ACME professional development has continued as planned. With kindergarten and first grade beginning the two year professional development series, all targeted grade levels, kindergarten through eighth grade, have participated on schedule.

Changes in the design were instigated the previous year to provide the ACME professional development annually for new hires and teachers who change grade levels. Although the changes addressed the ongoing need for ACME professional development, many new teachers were hired just before school started and missed the foundation provided in ACME summer institutes. A one day overview provided after the first day of classes was not sufficient preparation for teachers new to standards-based instruction. While some struggled with implementing standards-based curriculum resources, others did not attempt implementation.

Teacher attendance at ACME professional development continued for first time participants at rates similar to previous years, although in the summer of 2000 many teachers did not return for a second summer institute. For elementary, many kindergarten and first grade teachers (over 80%) participated in the first week of the ACME summer institute and a smaller number returned for the second week (70%). Similarly, approximately 85% of new second grade teachers, 70% of new third grade teachers, and 80% new fourth grade teachers attended the first week of their first ACME summer institute. Attendance dropped off in the second week for new fourth grade teachers (45%

returned). A large number of second and third grade teachers also did not return for their second ACME summer institute; only 30% of second and third grade teachers returned to complete ACME professional development. For middle school, while most new teachers (almost 100%) attended the first ACME summer institute, few middle school teachers (less than 33%) returned for the second summer institute.

SUPPORT FOR ACME REFORMS

CHANGES IN LEADERSHIP

Change in district leadership has impacted the level of support for the ACME vision of mathematics education. The district has had a different superintendent every year since the ACME project began. Deputy and area superintendents as well as ACME project leadership have changed. Key voices that originally rallied support for changes in mathematics education are no longer AISD leaders. Although in the past support for changes in mathematics education advocated by ACME was incomplete, recent changes in leadership resulted in a set back. New district leaders need to become knowledgeable of the design and implementation of the ACME project as well as its advantages and disadvantages for teaching and learning.

Change in district leadership has blurred the messages about the direction of mathematics education in the district and has yielded uncertainty on campuses. Support from campus administrators for the ACME vision of change in mathematics education continued to be variable across the district. While some campus administrators expect teachers to implement standards-based mathematics curriculum and instruction and structure time for teachers to collaborate and improve, other campus administrators do not endorse standards-based instruction and direct teachers toward other curriculum resources (Batchelder & Christian, 1999). Campus administrators who support ACME reforms organize teacher leaders to mentor other teachers as they develop standards-based instructional strategies, provide half-days for grade levels to collaborate on mathematics content. Campus administrators who do not support ACME reforms encourage teachers to use a battery of curriculum materials that are not standards-based, do not learn about standards-based curriculum and instruction, or do not communicate expectations that teachers will implement it.

Data from the LSC Principal Questionnaires indicate that support for standards-based mathematics instruction has declined from high endorsement in the Spring of 1998 to moderate endorsement in the Spring of 2000. In the third year of ACME, fewer principals strongly agreed that they were knowledgeable of national standards in mathematics and well-prepared to support teachers implementing standards-based instruction than had in the first year of the program. The difficulty establishing support for standards-based instruction may be due in part to high principal turn-over rates in the district. Some elementary and middle school principals (41%) reported that they were new to the job, holding the position of principal for 3 years or less; two-thirds (66%) had been principal at that particular school for 3 years or less; half (52%) had been a principal in AISD for 3 years or less.

The ACME project designed and used to provide professional development to help campus leaders support teachers implementing standards-based curriculum resources, however none were held in ACME's third year. The effectiveness of professional development for campus administrators appears to depend on principal's knowledge of systemic reform and readiness to

implement standards-based curriculum and instruction on their campuses as well as on support from central office leaders.

SUPPORT FROM STAKEHOLDERS

Stakeholders in the ACME project include elementary and middle school mathematics teachers, principals, central office administrators, as well as, parents, professionals in higher education, and other community members. In general, teachers supported the instructional practices of the ACME initiative in mathematics education highly; for example, a majority (90%) of the teachers surveyed on the LSC Teacher Questionnaire considered developing students' conceptual understanding in mathematics and hands-on activities "very important." A small proportion of teachers expressed opposition to implementing standards-based instruction by supplementing the curriculum resources with materials that are not standards-based. Opposition from the teachers' union to implementing the curriculum resources surfaced in the Spring of 2000 but was incited primarily by teachers on one campus. The number of teachers not attending the second summer institute raises concern that the design of ACME professional development is not meeting their needs.

According to teachers who responded to the LSC Teacher Questionnaire, parents continued to express neither strong support nor opposition to standards-based mathematics instruction as in previous years. District and ACME leaders have responded to opposition from vocal parents, however. To educate parents about what to expect from standards-based mathematics curriculum and instruction, many campuses have held family math nights annually, often with the support of ACME facilitators. ACME staff have also developed pamphlets to inform parents and distributed videos about standards-based mathematics. A new district initiative to spur parental involvement may further garner parental support in the 2000-2001 school year.

CONSISTENCY OF DISTRICT INITIATIVES

The consistency of district initiatives has gone far to align district policy and practices with the ACME vision for mathematics education. The AISD Language and Literacy Department has been implementing the Balanced Literacy Program and the Science and Health Education Department has been implementing FOSS for several years. Both initiatives are based on a constructivist approach to teaching and learning.

The new superintendent contracted with the Institute for Learning (IFL) in Pittsburgh to help district and campus leaders refocus teaching and learning districtwide. District staff and campus administrators have participated in workshops, demonstrations, and discussions with IFL staff. The district chose to focus on two of nine Principles of Learning, clear expectations and accountable talk, which ACME facilitators have posted and discussed in ACME professional development. While the knowledge and beliefs advocated by IFL appear to align with the ACME vision for mathematics education, it is unclear whether district and campus administrators are making connections explicit. IFL has the potential to help campus administrators become strong instructional leaders. This initiative could support the goals of the ACME project if the message about the connections is clear.

Another local initiative has the potential to support the ACME vision for mathematics education, although in practice the support has been spotty. In the 1999-2000 school year, the district initiated the Account for Learning (AFL) funding source to improve instruction on 42 campuses where student achievement was low. The initiative included an instructional specialist on each of

these 42 campuses to support teachers. ACME staff were formative to the professional development for these instructional specialists and shared information about standards-based mathematics instruction.

These specialists could participate in cognitive coaching, mentoring, and teacher collaboration necessary to help teachers develop standards-based pedagogical skills. However, only about five of the 42 specialists hired had participated in the ACME teacher cadre and had competence in standards-based mathematics instruction. Other AFL specialists were strong in language arts and some were pulled from classrooms to meet other organizational needs. Thus, a small number had the competence to lead standards-based mathematics instruction on their campuses. Moreover, interviews with specialists revealed that much of their time was spent mentoring new teachers, helping teachers analyze TAAS data, sharing strategies for TAAS preparation, and organizing campus instructional materials. To support the ACME vision for mathematics education, instructional specialists would be central to a plan to help teachers become strong implementers of standards-based mathematics instruction, including cognitive coaching and content-focused collaboration. The professional development provided AFL specialists may prepare them for some of these responsibilities, their success may depend on their beginning the position with a high level of knowledge and pedagogical skills in standards-based mathematics instruction as well as strong leadership skills and district and campus support.

CURRICULUM RESOURCES

In the Spring of 1999, AISD decided on dual textbook adoptions. The district chose to supplement the ACME curriculum resource *Investigations in Number, Data, and Space* with the traditional texts *Math in My World* for elementary schools and to supplement *CMP* with *Mathematics: Applications and Connections* for middle schools. A committee of teachers used a rubric that the Dana Center developed to evaluate curriculum resources. Although the two ACME resources were rated the highest, the district chose a dual adoption to fill in a few gaps in the TEKS standards, which vary by grade level, that emerged in *Investigations* and in *CMP*.

The dual adoption sent mixed messages to teachers and administrators. While adopting a textbook to fill a few gaps in the TEKS and appease stakeholders who prefer a textbook, it sends mixed messages about AISD's direction in mathematics education. In interviews, some teachers expressed concern about others not implementing *Investigations* and *CMP*. In classroom observations, a few teachers used the textbooks for topics covered in *Investigations* and *CMP*. In AISD, dual adoption was a compromise that deterred the complete implementation of standards-based curriculum resources.

STUDENT ASSESSMENT

A persistent deterrent to implementing standards-based mathematics curriculum and instruction was teacher concern about the statewide assessment TAAS and preparing students to pass the test (see "Student TAAS Mathematics Results and the Quality of Teacher Implementation," pp. **5-8**). As in previous years, teachers expressed anxiety about the compatibility of standards-based curriculum and instruction with student achievement on TAAS (see Batchelder & Christian, 1999). One teacher stated, "We are all bound by TAAS; I don't feel like *Investigations* leads us to TAAS." The fear of low TAAS performance continued to influence decisions about curriculum. One teacher

reported in April of 2000, "For the past six weeks, I have had to abandon *Investigations* to teach TAAS test-taking strategies."

AISD and the ACME project have taken several approaches to allay this anxiety. Early on, the ACME project addressed these teacher concerns by designing ACME professional development activities to examine TAAS items as they relate to standards-based curriculum and instruction. In the 1999-2000 school year, AISD administrators established the policy that teachers would teach the state standards TEKS. The district also contracted the Dana Center's professional development "TEKS for Leaders" for campus administrators and district curriculum staff. These sessions demonstrated the direct link between the TEKS and the TAAS.

INSTITUTIONALIZATION OF ACME REFORMS

HIGH QUALITY PROFESSIONAL DEVELOPMENT

The foundation for institutionalizing ACME reforms rests on the extensive, in-house professional development program that helps teachers learn to implement standards-based curriculum resources and instruction. If AISD decides to continue providing ACME professional development, staff development days, and stipends for teachers, many AISD teachers will continue to learn how to implement standards-based curriculum and instruction. This sustenance also depends on maintaining a small staff of high quality professional development facilitators. However, limitations on the quality of implementation most likely will persist without widely available structures of professional development that promote improvements in teachers' pedagogical skills and content knowledge (e.g., cognitive coaching, content-focused collaborative inquiry, and mentoring).

SUPPORT FOR STANDARDS-BASED MATHEMATICS EDUCATION

The strongest support for standards-based mathematics education currently comes from teachers and some district and campus administrators. Given the link between student mathematics achievement and strong implementation of standards-based instruction, an advantage of the ACME reforms is the impact on student learning. Thus, institutionalizing standards-based mathematics curriculum and instruction would support the central goal of AISD, improving student learning. To institutionalize the ACME reforms, work is still needed to inform district and campus administrators about standards-based instruction and the process of systemwide change and to garner the support of a majority. A clear message about the direction of AISD mathematics education is lacking. Continued work educating parents about standards-based mathematics instruction and helping them feel comfortable with the changes is also necessary. Developing relationships with institutions of higher education could be a means for addressing the preparation of new hires in standards-based instruction and for improving the mathematics content knowledge of teachers.

SUMMARY AND RECOMMENDATIONS

STRENGTHS OF ACME PROJECT

In the third year of the project, the ACME project presented the following strengths:

- Strong implementation of standards-based mathematics curriculum and instruction was associated with high student achievement.
- ACME professional development helped teachers learn to implement standards-based curriculum resources.
- In conjunction with the ACME project, AISD provided all teachers with standards-based curriculum resources (including kits, copies of student sheets, and planning tools).

ADAPTATIONS TO ACME PROJECT

From the start, staff adapted ACME professional development to meet teachers' needs by:

- Focusing conversations and professional development activities on student thinking;
- Developing the culture of a learning community;
- Providing copies of student sheets and bilingual materials;
- Designing separate sessions for special education teachers;
- Establishing norms for professional development;
- Integrating planning time into ACME professional development;
- Developing planning tools to support implementation; and
- Scheduling sessions on Saturday, after school, and at North and South locations.

Although staff have adapted the ACME project to meet the needs of many teachers, some weaknesses in the design have not been addressed either by ACME or AISD. Districtwide structures that support implementation of standards-based instruction on all AISD campuses and meaningful teacher collaboration have not been developed. Teacher leadership from "experts" in standards-based instruction has remained untapped, except at a few sites.

CHALLENGES OF ACME PROJECT

In the third year of the project, the ACME project manifested the following challenges:

- Teachers across the district did not receive support for developing standards-based pedagogical skills and for deepening their mathematics content knowledge.
- Low attendance at summer institutes indicated that ACME professional development was not a high priority for many teachers.
- District and campus administrators did not uniformly support teacher implementation.

RECOMMENDATIONS

1. *Enlist district administrators to communicate a clear message about the district's vision for mathematics education because mixed messages have fostered piecemeal implementation of standards-based instruction across the district.* Broadcast the message on the AISD cable channel to reach teachers, campus administrators, parents, and community members. In area principal meetings, include 10 minute updates on the mathematics program (e.g., attendance at ACME professional development, TEKS and TAAS mathematics objectives, and the association between standards-based instruction and student achievement).

2. *Make explicit the connections between ACME and other district initiatives, especially IFL, because the approaches to teaching and learning are compatible.* IFL is an opportunity to strengthen the instructional leadership of district and campus administrators, which is a weak link in AISD's implementation of standards-based mathematics. Making the connections explicit should foster a shared vision for AISD's direction in curriculum and instruction and bolster necessary administrative support. Strong principal support occurs when administrators have knowledge of standards-based instruction and the process of systemic reform, commit and advocate for implementation, and organize teacher collaboration and leadership (Batchelder & Christian, 1999; St. John et al., 1999). If AISD is not able to bolster administrative support for standards-based mathematics instruction, it should look at other mathematics programs.

3. *Hire and train campus instructional specialists who are skilled in standards-based mathematics instruction through AFL funding.* Establish collaborative relationships between these specialists and ACME facilitators to provide a network of strong support for implementation on campuses. Concentrate this campus support on cognitive coaching and content-focused collaboration. By developing effective forms of campus support, AISD will help more teachers become strong implementers of standards-based mathematics instruction, which is linked to high levels of student achievement on TAAS mathematics (especially problem-solving skills that will be key to passing future versions of TAAS).

4. *Provide new ACME staff with professional development to maintain the quality of ACME professional development for teachers.* To ease the transition in ACME staff, develop cognitive coaching among team members and routinely examine teacher evaluations of ACME professional development to devise strategies to improve facilitators' skills.

REFERENCES

Batchelder, M. L. (1999, December). *The Austin Collaborative for Mathematics Education: 1998-1999 Annual Report*. (AISD, Publication No. 97-14). Austin, TX: Austin Independent School District.

Batchelder, M. L., & Christian, C. L. (1999, September). *The Austin Collaborative for Mathematics Education: Case Study: 1998-1999*. (AISD, Publication No. 98.08). Austin, TX: Austin Independent School District.

Ball, D. (1999, April). *Studying teaching and learning through the eye of the beholder*. Symposium presented at the annual meeting of the American Educational Research Association, Montreal, Canada.

Cohen, D. K., & Ball, D. L. (1990). Policy and practice: An overview. *Educational Evaluation and Policy Analysis, 12(3)*, 347-353.

Horizon Research, Inc. (1999a, March). *1998-99 Local Systemic Change: Classroom Observation Protocol*. Chapel Hill, NC: Author.

Horizon Research, Inc. (1999b, March). *1998-99 Local Systemic Change: Professional Development Observation Protocol*. Chapel Hill, NC: Author.

Mokros, J., Russell, S. J., & Economopoulos, K. (1995). *Beyond Arithmetic: Changing Mathematics in the Elementary Classroom*. Palo Alto, Dale Seymour.

National Council of Teachers of Mathematics (1989). *Curriculum and Evaluation Standards for School Mathematics*. Reston, VA: NCTM.

National Council of Teachers of Mathematics (1991). *Professional Standards for Teaching Mathematics*. Reston, VA: NCTM.

National Council of Teachers of Mathematics (1995). *Assessment Standards for School Mathematics*. Reston, VA: NCTM.

Russell, S. J. (1998). Mathematics curriculum implementation: Not a beginning, not an end. *Hands On! Hands On Math and Science Learning, 21(1)*, 6-9, 29.

Schulman-Dacey, L., & Eston, R. (1999). *Growing Mathematical Ideas in Kindergarten*. Sausalito, CA: Math Solutions.

St. John, M., Century, J., Eggers-Pierola, C., Houghton, N., Jennings, S., & Tibbitts, F. (1999, April). *The principals of educational reform: Supporting mathematics and science teaching in your school, a handbook for elementary and middle school principals*. Inverness, CA: Inverness Research.

APPENDICES

Appendix A. Gains and Losses in Student TAAS Mathematics

Figure 21 presents the gains and losses in the percentage of students passing TAAS mathematics between the 1998-99 and 1999-2000 school years by grade levels and by disaggregated groups (i.e., all students, African American, Hispanic, White, and economically disadvantaged). This figure shows that the greatest gains were made by African American, Hispanic, and economically disadvantaged students (except for 3rd grade students), although their percentage passing continued to lag behind White students (see Figures 1 through 12).

Figure 22 presents the gains and losses in the gains and losses in the mean TLI between the 1998-99 and 1999-2000 school years by grade levels and by disaggregated groups. This figure also demonstrates that greatest gains were made by African American, Hispanic, and economically disadvantaged students than by White students, although the mean TLI for these groups was consistently lower than that of White students (see Figures 1 through 12).

Figure 21. Gains and Losses in Percentage of Students Passing TAAS Mathematics Between 1998-99 and 1999-2000

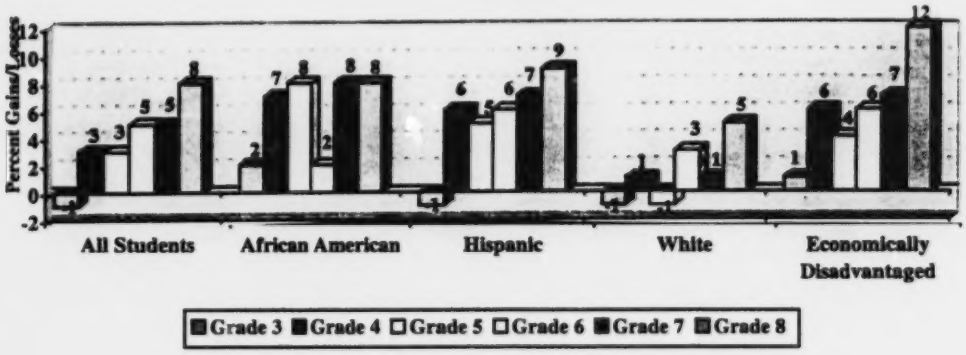
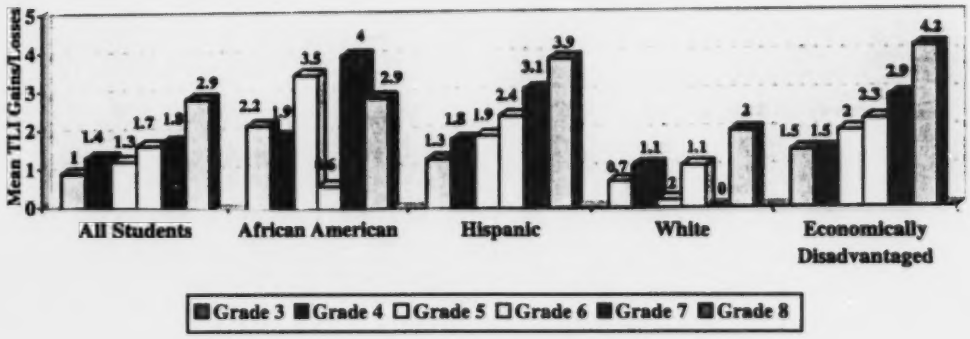


Figure 22. Gains and Losses in Mean TLI for Students in TAAS Mathematics Between 1998-99 and 1999-2000



BEST COPY AVAILABLE

Appendix B. ACME Professional Development and Change in Implementation

Table 1. Frequencies of Changes in the Number of Professional Development Days by Changes in Observation Ratings from Spring of 1999 to Spring of 2000.

	Change in Professional Development Days			
Change in Observation Rating	**3 or fewer days**	**4-11 days**	**12 or more days**	**Total**
ADVANCED				
Weak to moderate implementation				
1A→ 3 solid	1			1
2→ 3 low		1	1	2
2→ 3 solid			1	1
Moderate to strong implementation				
3 low→ 3 high		1	1	2
Total	1	2	3	6
NO CHANGE				
Weak implementation				
1A→ 2		1		1
2	5		1	6
2→ 1A		1		1
Moderate implementation				
3 low→ 3 solid	1			1
3 low		1		1
3 solid		1		1
3 solid→ 3 low	1	1	1	3
Strong implementation				
3 high		2		2
4	1	3		4
4→ 3 high	1		1	2
5→ 4	2			2
Total	11	10	3	24
REGRESSED				
Moderate to weak implementation				
3 low→ 1A		1		1
3 low→ 1B		1		1
3 low→ 2	2	1		3
Strong to moderate implementation				
3 high→ 3 low		1		1
3 high→ 3 solid		1		1
4→ 3 low		1		1
Strong to weak implementation				
4→ 2		1		1
5→ 2	1			1
Total	3	7	0	10

Appendix C. Evaluation Instruments

1999–2000 Local Systemic Change
Pre-Classroom Observation Interview

After you have expressed appreciation to the teacher for allowing you to observe the class, ask the following question:

1. What has this class been doing in mathematics/science recently?

   PROBES: What unit are you working on?
   What instructional materials are you using*?

2. What do you anticipate doing in your mathematics/science class on the day I will be observing?

   PROBE: What do you hope students will learn as a result of the work you have planned?

3. What is the next step for this class?

4. Is there anything in particular that I should know about the group of students that I will be observing?

---

* Note that the evaluator will need to be thoroughly conversant with the instructional materials designated for use by the LSC in order to complete the observation ratings.

1999–2000 Local Systemic Change
Post-Classroom Observation Interview

After you have expressed appreciation to the teacher for allowing you to observe the class, ask the following questions:

1. Were there any ways in which the lesson was different from what you had planned?

2. What did this lesson tell you about what your students are learning and still need to learn in mathematics/science?

   PROBE: How do you plan to further assess the students' learning?

3. What challenges have you faced in encouraging your students to be actively engaged in this mathematics/science class?

   PROBE: How have you approached these challenges?

4. What is the next step for this class?

NOTE: This form is included for information purposes only. Evaluators will need to complete the form on the Web.

1999–2000 Local Systemic Change Classroom Observation Protocol[1]

BACKGROUND INFORMATION

Project _____

LSC ID[2] _____

Subject Observed[3] _____

Grade Level _____

Date of Observation _____

Time of Observation:

Start _____ End _____

Observer _____

Observer's Role in Project:

___ Lead Evaluator

___ Other Certified Observer

SECTION ONE: CONTEXTUAL BACKGROUND AND ACTIVITIES

In this section, please fill in the circles that best describe the class. ***For each item, be sure to fill in all responses that apply.***

I. Classroom Demographics and Context

A. What is the total number of students in the class at the time of the observation?

- O 15 or fewer
- O 16–20
- O 21–25
- O 26–30
- O 31 or more

B. What is the approximate percentage of white (not Hispanic origin) students in this class?

- O 0–10 percent
- O 11–25 percent
- O 26–50 percent
- O 51–75 percent
- O 76–100 percent

C. Indicate the *teachers*:

1. Gender
   O Male O Female
2. Race/Ethnicity
   - O African-American (not Hispanic origin)
   - O American Indian or Alaskan Native
   - O Asian or Pacific Islander
   - O Hispanic
   - O White (not Hispanic origin)
   - O Other

D. If applicable, indicate the *teacher aides*:

1. Gender
   O Male O Female
2. Race/Ethnicity
   - O African-American (not Hispanic origin)
   - O American Indian or Alaskan Native
   - O Asian or Pacific Islander
   - O Hispanic
   - O White (not Hispanic origin)
   - O Other

---

[1] Be sure you have read the "1999–2000 Local Systemic Change Classroom Observations: Guidelines for Evaluators" and have completed the "Pre-

[2] Use the LSC ID number as indicated in the Classroom Observation Sample provided by HRI.

[3] In mathematics/science projects observe the subject for which the teacher was sampled.

E. Rate the adequacy of the physical environment.

1. Classroom resources:

O	O	O	O	O
1	2	3	4	5
Sparsely equipped				Rich in resources

2. Classroom Space:

O	O	O	O	O
1	2	3	4	5
Crowded				Adequate space

3. Room arrangement:

O	O	O	O	O
1	2	3	4	5
Inhibited interactions among students				Facilitated interactions among students

II. Lesson Description

In a paragraph or two, describe the lesson you observed. Include where this lesson fits in the overall unit of study. Be sure to include enough detail to provide a context for your ratings of this lesson and also to allow you to recall the details of this lesson when needed in future years for longitudinal analysis.

III. Purposes of Lesson

A. Indicate the *major*[4] *content area(s)* of this lesson or activity.

- O 1. Numeration and number theory
- O 2. Computation
- O 3. Estimation
- O 4. Measurement
- O 5. Patterns and relationships
- O 6. Pre-algebra
- O 7. Algebra
- O 8. Geometry and spatial sense
- O 9. Functions (including trigonometric functions) and pre-calculus concept
- O 10. Data collection and analysis
- O 11. Probability
- O 12. Statistics (e.g., hypothesis tests, curve-fitting, and regression)
- O 13. Topics from discrete mathematics (e.g., combinatorics, graph theory, recursion)
- O 14. Mathematical structures (e.g., vector spaces, groups, rings, fields)
- O 15. Calculus
- O 16. Life Science (please specify: _____)
- O 17. Physical science (please specify: _____)
- O 18. Earth/space sciences
  - O a. Astronomy
  - O b. Oceanography
  - O c. Geology
  - O d. Meteorology
  - O e. Environmental sciences
- O 19. Engineering and design principles
- O 20. History of mathematics/science
- O 21. None of the above (please explain)

54

[4] "Major" means was used or addressed for a substantial portion of the lesson; if you were describing the lesson to someone, this feature would help characterize it.

B. Indicate the *primary intended purpose(s)* of this lesson or activity based on the pre- and/or post-observation interviews with the teacher.

- O 1. Identifying prior student knowledge
- O 2. Introducing new concepts
- O 3. Developing conceptual understanding
- O 4. Reviewing mathematics/science concepts
- O 5. Developing problem-solving skills
- O 6. Learning mathematics/science processes, algorithms, or procedures
- O 7. Learning vocabulary/specific facts
- O 8. Practicing computation for mastery
- O 9. Developing appreciation for core ideas in mathematics/science
- O 10. Developing students'awareness of contributions of scientists/mathematicians of diverse backgrounds
- O 11. Assessing student understanding

IV. Instructional Materials

A. Is this lesson based on instructional materials designated for use by this LSC?

O Yes O No, SKIP to Part V below

B. Indicate the *single* set of LSC-designated instructional materials intended to form the basis of this lesson (e.g., FOSS; Insights; STC; Investigations in Number, Data, and Space; Connected Math; IMP; SEPUP), based on the information provided in the pre-observation interview.

Please specify. _____

C. How closely did the lesson adhere to the instructions provided in the teacher's manual?

O Exactly, SKIP to Part V below
O Almost totally O Mostly O Somewhat O A little O Hardly at all

D. How did the adaptations affect the quality of the lesson?

O Helped a lot O Helped a little O Neutral O Hurt a little O Hurt a lot

V. Classroom Instruction

A. Indicate the *major*[5] *way(s)* in which student activities were structured.

O As a whole group O As small groups O As pairs O As individuals

B. Indicate the *major*[5] *way(s)* in which students engaged in class activities.

O Entire class was engaged in the same activities at the same time.
O Groups of students were engaged in different activities at the same time (e.g., centers).

[5] "Major" means was used or addressed for a substantial portion of the lesson; if you were describing the lesson to someone, this feature would help characterize it.

C. **Indicate the *major*[6] *activities* of students in this lesson.** When choosing an umbrella category, be sure to indicate subcategories that apply as well. (For example, if you mark listened to a presentation, indicate by whom.)

- O 1. Listened to a presentation:
  - O a. By teacher (would include: demonstrations, lectures, media presentations, extensive procedural instructions)
  - O b. By student (would include informal, as well as formal, presentations of their work)
  - O c. By guest speaker/expert serving as a resource

- O 2. Engaged in discussion/seminar:
  - O a. Whole group
  - O b. Small groups/pairs

- O 3. Engaged in problem solving/investigation:
  - O a. Worked with manipulatives
  - O b. Played a game to build or review knowledge/skills
  - O c. Followed specific instructions in an investigation
  - O d. Had some latitude in designing an investigation
  - O e. Recorded, represented and/or analyzed data
  - O f. Recognized patterns, cycles or trends
  - O g. Evaluated the validity of arguments or claims
  - O h. Provided an informal justification or formal proof

- O 4. Engaged in reading/reflection/written communication about mathematics or science:
  - O a. Read about mathematics/science
  - O b. Answered textbook/worksheet questions
  - O c. Reflected on readings, activities, or problems individually or in groups
  - O d. Prepared a written report
  - O e. Wrote a description of a plan, procedure, or problem-solving process
  - O f. Wrote reflections in a notebook or journal

- O 5. Used technology/audio-visual resource:
  - O a. To develop conceptual understanding
  - O b. To learn or practice a skill
  - O c. To collect data (e.g., probeware)
  - O d. As an analytic tool (e.g., spreadsheets or data analysis)
  - O e. As a presentation tool
  - O f. For word processing or as a communications tool (e.g., e-mail, Internet, Web)

- O 6. Other activities
  - O a. Arts and crafts activity
  - O b. Listened to a story
  - O c. Wrote a poem or story
  - O d. Other (Please specify.) _____

[6] "Major" means was used or addressed for a substantial portion of the lesson; if you were describing the lesson to someone, this feature would help characterize it.

D. Comments

Please provide any additional information you consider necessary to capture the activities or context of this lesson. Include comments on any feature of the class that is so salient that you need to get it on the table right away to help explain your ratings; for example, the class was interrupted by a fire drill, the kids were excited about an upcoming school event, or the teacher's tone was so warm (or so hostile) that it was an overwhelmingly important feature of the lesson.

SECTION TWO: RATINGS

In Section One of this form, you documented what occurred in the lesson. In this section, you are asked to rate each of a number of key indicators in four different categories, from 1 (not at all) to 5 (to a great extent). You may list any additional indicators you consider important in capturing the essence of this lesson and rate these as well. Use your "Ratings of Key Indicators" (Part A) to inform your "Synthesis Ratings" (Part B). It is important to indicate in "Supporting Evidence for Synthesis Ratings" (Part C) what factors were most influential in determining your synthesis ratings and to give specific examples or quotes to illustrate those factors.

Note that any one lesson is not likely to provide evidence for every single indicator; use 6, "Don't know" when there is not enough evidence for you to make a judgment. Use 7, "N/A" (Not Applicable) when you consider the indicator inappropriate given the purpose and context of the lesson. Section Two concludes with ratings of the likely impact of instruction, and a capsule description of the lesson.

I. Design

A. Ratings of Key Indicators

	Not at all				To a great extent	Dont know	N/A
1. The design of the lesson incorporated tasks, roles, and interactions consistent with investigative mathematics/science.	1	2	3	4	5	6	7
2. The design of the lesson reflected careful planning and organization.	1	2	3	4	5	6	7
3. The instructional strategies and activities used in this lesson reflected attention to students'experience, preparedness, and/or learning styles.	1	2	3	4	5	6	7
4. The resources available in this lesson contributed to accomplishing the purposes of the instruction.	1	2	3	4	5	6	7
5. The instructional strategies and activities reflected attention to issues of access, equity, and diversity for students (e.g., use of wait time, cooperative learning, language-appropriate strategies/materials).	1	2	3	4	5	6	7
6. The design of the lesson encouraged a collaborative approach to learning.	1	2	3	4	5	6	7
7. Adequate time and structure were provided for "sense-making."	1	2	3	4	5	6	7
8. Adequate time and structure were provided for wrap-up and closure.	1	2	3	4	5	6	7
9. Formal assessments of students were consistent with investigative mathematics/science.	1	2	3	4	5	6	7
10. Design for future instruction takes into account what transpired in the lesson.	1	2	3	4	5	6	7
11. _____	1	2	3	4	5		

B. Synthesis Rating

1	2	3	4	5
Design of the lesson not at all reflective of best practice in mathematics/science education				Design of the lesson extremely reflective of best practice in mathematics/science education

C. Supporting Evidence for Synthesis Rating

II. Implementation

A. Ratings of Key Indicators

	Not at all				To a great extent	Dont know	N/A
1. The instruction was consistent with the underlying approach of the instructional materials designated for use by the LSC.	1	2	3	4	5	6	7
2. The instructional strategies were consistent with investigative mathematics/science.	1	2	3	4	5	6	7
3. The teacher appeared confident in his/her ability to teach mathematics/science.	1	2	3	4	5	6	7
4. The teacher's classroom management style/strategies enhanced the quality of the lesson.	1	2	3	4	5	6	7
5. The pace of the lesson was appropriate for the developmental levels/needs of the students and the purposes of the lesson.	1	2	3	4	5	6	7
6. The teacher took into account prior knowledge of students.	1	2	3	4	5	6	7
7. The teacher's questioning strategies were likely to enhance the development of student conceptual understanding/problem solving (e.g., emphasized higher order questions, appropriately used 'wait time,' identified prior conceptions and misconceptions).	1	2	3	4	5	6	7
8. The lesson was modified as needed based on teacher questioning or other student assessments.	1	2	3	4	5	6	7
9. _____	1	2	3	4	5		

B. Synthesis Rating

1	2	3	4	5
Implementation of the lesson not at all reflective of best practice in mathematics/science education				Implementation of the lesson extremely reflective of best practice in mathematics/science education

C. Supporting Evidence for Synthesis Rating

III. Mathematics/Science Content

A. Ratings of Key Indicators	Not at all				To a great extent	Dont know	N/A
1. The mathematics/science content was significant and worthwhile.	1	2	3	4	5	6	7
2. The mathematics/science content was appropriate for the developmental levels of the students in this class.	1	2	3	4	5	6	7
3. Students were intellectually engaged with important ideas relevant to the focus of the lesson.	1	2	3	4	5	6	7
4. Teacher-presented information was accurate.	1	2	3	4	5	6	7
5. The teacher displayed an understanding of mathematics/science concepts (e.g., in his/her dialogue with students).	1	2	3	4	5	6	7
6. Mathematics/science was portrayed as a dynamic body of knowledge continually enriched by conjecture, investigation analysis, and/or proof/justification.	1	2	3	4	5	6	7
7. Elements of mathematical/science abstraction (e.g., symbolic representations, theory building) were included when it was important to do so.	1	2	3	4	5	6	7
8. Appropriate connections were made to other areas of mathematics/ science, to other disciplines, and/or to real-world contexts.	1	2	3	4	5	6	7
9. The degree of "sense-making" of mathematics/science content within this lesson was appropriate for the developmental levels/needs of the students and the purposes of the lesson.	1	2	3	4	5	6	7
10. _____	1	2	3	4	5		

B. Synthesis Rating

1	2	3	4	5
Mathematics/science content of lesson not at all reflective of current standards for mathematics/science education				Mathematics/science content of lesson extremely reflective of current standards for mathematics/science education

C. Supporting Evidence for Synthesis Rating

IV. Classroom Culture

A1. Ratings of Key Indicators

	Not at all				To a great extent	Dont know	N/A
1. Active participation of all was encouraged and valued.	1	2	3	4	5	6	7
2. There was a climate of respect for students'ideas, questions, and contributions.	1	2	3	4	5	6	7
3. Interactions reflected collaborative working relationships among students (e.g., students worked together, talked with each other about the lesson).	1	2	3	4	5	6	7
4. Interactions reflected collaborative working relationships between teacher and students.	1	2	3	4	5	6	7
5. The climate of the lesson encouraged students to generate ideas, questions, conjectures, and/or propositions.	1	2	3	4	5	6	7
6. Intellectual rigor, constructive criticism, and the challenging of ideas were evident.	1	2	3	4	5	6	7
7. _____	1	2	3	4	5		

A2. Respect for Diversity

Based on the culture of a classroom, observers are generally able to make inferences about the extent to which there is an appreciation of diversity among students (e.g., their gender, race/ethnicity, and/or cultural background). While direct evidence that reflects particular sensitivity or insensitivity toward diversity is not often observed, we would like you to document any examples you do see. If any examples were observed, please check here ☐ and describe below:

B. Synthesis Rating

1	2	3	4	5
Classroom culture interfered with student learning				Classroom culture facilitated the learning of all students

C. Supporting Evidence for Synthesis Rating

V. Overall Ratings of the Lesson

A. Likely Impact of Instruction on Students' Understanding of Mathematics/Science

While the impact of a single lesson may well be limited in scope, it is important to judge whether the lesson is likely to help move students in the desired direction. For this series of ratings, consider all available information (i.e., your previous ratings of design, implementation, content, and classroom culture, and the pre- and post-observation interviews with the teacher) as you assess the likely impact of this lesson. Feel free to elaborate on ratings with comments in the space provided.

Select the response that best describes your overall assessment of the *likely effect* of this lesson in each of the following areas.

	Negative effect		Mixed or neutral effect		Positive effect	Dont know	N/A
1. Students'understanding of mathematics/science as a dynamic body of knowledge generated and enriched by investigation.	O	O	O	O	O	O	O
2. Students'understanding of important mathematics/science concepts.	O	O	O	O	O	O	O
3. Students'capacity to carry out their own inquiries.	O	O	O	O	O	O	O
4. Students'ability to apply or generalize skills and concepts to other areas of mathematics/science, other disciplines, and/or real-life situations.	O	O	O	O	O	O	O
5. Students'self-confidence in doing mathematics/science.	O	O	O	O	O	O	O
6. Students'interest in and/or appreciation for the discipline.	O	O	O	O	O	O	O

Comments (optional):

B. Capsule Description of the Quality of the Lesson

In this final rating of the lesson, consider all available information about the lesson, its context and purpose, and your own judgment of the relative importance of the ratings you have made. Select the capsule description that best characterizes the lesson you observed. Keep in mind that this rating is *not* intended to be an average of all the previous ratings, but should encapsulate your overall assessment of the quality and likely impact of the lesson. Please provide a brief rationale for your final capsule description of the lesson in the space provided.

O **Level 1: Ineffective Instruction**
There is little or no evidence of student thinking or engagement with important ideas of mathematics/science. Instruction is *unlikely* to enhance students' understanding of the discipline or to develop their capacity to successfully "do" mathematics/science. Lesson was characterized by either (select one below):

O **Passive "Learning"**
Instruction is pedantic and uninspiring. Students are passive recipients of information from the teacher or textbook; material is presented in a way that is inaccessible to many of the students.

O **Activity for Activity's Sake**
Students are involved in hands-on activities or other individual or group work, but it appears to be activity for activity's sake. Lesson lacks a clear sense of purpose and/or a clear link to conceptual development.

O **Level 2: Elements of Effective Instruction**
Instruction contains some elements of effective practice, but there are *substantial problems* in the design, implementation, content, and/or appropriateness for many students in the class. For example, the content may lack importance and/or appropriateness; instruction may not successfully address the difficulties that many students are experiencing, etc. Overall, the lesson is *quite limited* in its likelihood to enhance students' understanding of the discipline or to develop their capacity to successfully "do" mathematics/science.

O **Level 3: Beginning Stages of Effective Instruction** (Select one below.)
O Low 3 O Solid 3 O High 3
Instruction is purposeful and characterized by quite a few elements of effective practice. Students are, at times, engaged in meaningful work, but there are *some weaknesses* in the design, implementation, or content of instruction. For example, the teacher may short-circuit a planned exploration by telling students what they "should have found"; instruction may not adequately address the needs of a number of students; or the classroom culture may limit the accessibility or effectiveness of the lesson. Overall, the lesson is *somewhat limited* in its likelihood to enhance students' understanding of the discipline or to develop their capacity to successfully "do" mathematics/science.

O **Level 4: Accomplished, Effective Instruction**
Instruction is purposeful and engaging for most students. Students actively participate in meaningful work (e.g., investigations, teacher presentations, discussions with each other or the teacher, reading). The lesson is well-designed and the teacher implements it well, but adaptation of content or pedagogy in response to student needs and interests is limited. Instruction is *quite likely* to enhance most students' understanding of the discipline and to develop their capacity to successfully "do" mathematics/science.

O **Level 5: Exemplary Instruction**
Instruction is purposeful and all students are highly engaged most or all of the time in meaningful work (e.g., investigation, teacher presentations, discussions with each other or the teacher, reading). The lesson is well-designed and artfully implemented, with flexibility and responsiveness to students' needs and interests. Instruction is *highly likely* to enhance most students' understanding of the discipline and to develop their capacity to successfully "do" mathematics/science.

Please provide your rationale for the capsule rating:

Local Systemic Change
Pre-Observation Interview with
Professional Development Facilitator

1. Please talk with me briefly about the primary purposes of the professional development session I will be observing.

   PROBE: What do you hope participants will gain as a result of their participation in this session?[1]

2. What do you anticipate happening during the session I will be observing?

   PROBES: Will the session include any of the materials the LSC has designated for classroom use?
   If so, how will they be used?

3. How does this session fit into the sequence of professional development experiences planned for this district's teachers?

   PROBES: What experiences have these participants had with the LSC prior to this session?

   What will they do next, with regard to professional development?

4. Tell me a little about your background as it relates to the session you will be facilitating.

5. Is there anything in particular that I should know about the participants who will be attending this session?

---

[1] Several of the ratings on the Professional Development Observation Protocol require an understanding of the intended purposes of the session. If the facilitator is not explicit in describing the purposes of the session, further probes may be needed. Additional probes might include direct questions about the extent to which the session is intended to enhance participants' content knowledge, to explore pedagogical strategies/instructional materials or to explore strategies/issues/roles for teacher leaders, principals, or others in leadership positions. Refer to Section One, IIIA on the Professional Development Observation Protocol for a list of potential purposes.

NOTE:	This form is included for information purposes only. Evaluators will need to complete the form on the Web.

1999–2000 Local Systemic Change Professional Development Observation Protocol[1]

BACKGROUND INFORMATION

Project _____

Location _____

Observer _____

Date of Observation _____

If you are submitting two professional development observations for this date, indicate whether this was the first or second session observed. O 1st O 2nd

Approximate Duration of Observation[2]:
O 1 hour O 3 hours
O 2 hours O half day

Observer's Role in Project: O Lead Evaluator O Other

Subject Targeted by session O Mathematics O Science O Both Mathematics and Science

SECTION ONE: CONTEXTUAL BACKGROUND AND ACTIVITIES

In this section, please fill in the circles that best describe the session. ***For each item, be sure to fill in all responses that apply.***

I. Session Demographics

A. What is the total number of participants attending this session?

O 1–5 O 6–10 O 11–20 O 21–50 O 51–100 O More than 100

B. Please describe the targeted subject(s)/grade level(s)/audience for this professional development session.

1. This session was intended to improve the teaching of: (select all that apply)
   - O Elementary science
   - O Middle grades science
   - O High school science
   - O Elementary mathematics
   - O Middle grades mathematics
   - O High school mathematics

2. Participants were:
   - O Lead teachers for the LSC projects
   - O Other (non-lead) teachers
   - O Administrators
   - O Other (Please specify.) _____

---

[1] Be sure you have read the "1999–2000 Local Systemic Change Professional Development Observations: Guidelines for Evaluators" and have completed the "Pre-Observation Interview with Professional Development Facilitator" before observing the session.

[2] The observation recorded on this form should be no less than one hour and no more than half a day.

C. Please describe the major presenters/facilitators[3] for this particular one-hour to half-day professional development session.

1. Indicate the number of presenters/facilitators in each gender and race/ethnicity category.

	African-American (not Hispanic-origin)	American Indian or Alaskan Native	Asian or Pacific Islander	Hispanic	White (not Hispanic origin)	Other
Male						
Female						

2. Indicate the number of presenters/facilitators for this particular session with each affiliation.

Regular Full-Time or Part-Time Classroom Teachers	Teachers on Special Assignment[4]	District Mathematics/ Science Supervisor	Other District Personnel	University Mathematics/ Science Faculty	University Mathematics/ Science Education Faculty	Business Industry Mathematicians/ Scientists	Other Non-District Personnel

II. Session Context

In a few sentences, describe the session you observed. Include: (a) whether the observation covered a partial or complete session, (b) whether there were multiple break-out sessions, and (c) where this session fits in the project's sequence of professional development for those in attendance.

III. Session Focus

A. Indicate the *primary intended purpose(s)* of this professional development session based on the information provided by the project staff or session organizer/facilitator.

O 1. Increasing mathematics/science content knowledge of participants. (*Be sure to complete Category III: Mathematics/Science Content and Category VII.A: Likely Impact on Participants' Capacity to Provide High-Quality Mathematics/Science Education, in Section Two of the protocol.*)

O 2. *Explicit* attention to classroom pedagogy/designated instructional materials. (*Be sure to complete Category IV: Exploring Pedagogy/Instructional Materials and Category VII.A: Likely Impact on Participants' Capacity to Provide High-Quality Mathematics/Science Education, in Section Two of the protocol.*)

- O a. Creating a vision of effective mathematics/science instruction
- O b. Understanding student thinking/learning about mathematics/science content
- O c. Learning how to use specific instructional materials in the classroom
- O d. Learning how to use technology in the classroom.
- O e. Learning pedagogical/classroom management strategies
- O f. Considering issues of access, equity, and diversity
- O g. Designing or scoring student assessments
- O h. Considering issues of scope and sequence (e.g., K-12 curricular frameworks)

O 3. *Explicit* attention to strategies/issues/roles of teacher leaders, principals, or others in leadership positions. (*Be sure to complete Category V: Leadership Content and Category VII.B: Likely Impact on Participants' Leadership Capacity, in Section Two of the protocol.*)

O 4. Other major purposes:

- O a. Orientation to the project
- O b. Assessing participants' knowledge/skills
- O c. Building professional networks among educators
- O d. Promoting/exploring reflective practice
- O e. Developing the capacity of participants to use technology
- O f. Involving administrators and/or other school/district personnel in the reform process

---

[3] In some instances this may not be appropriate, e.g., a session in which a group of teachers meets after school to discuss their action research projects may have no presenters or facilitators. In these instances, please leave the presenters/facilitators cells blank.

[4] Defined as teachers released full-time from classroom responsibilities to work on assignments such as the LSC project.

B. Indicate the *major*[5] *mathematics/science content area(s)* addressed in this professional development session, whether increasing content knowledge was a stated purpose or the mathematics/science content was simply a vehicle for achieving other purposes.

- O 1. Numeration and number theory
- O 2. Computation
- O 3. Estimation
- O 4. Measurement
- O 5. Patterns and relationships
- O 6. Pre-algebra
- O 7. Algebra
- O 8. Geometry and spatial sense
- O 9. Functions (including trigonometric functions) and pre-calculus concepts
- O 10. Data collection and analysis
- O 11. Probability
- O 12. Statistics (e.g., hypothesis tests, curve-fitting, and regression)
- O 13. Topics from discrete mathematics (e.g., combinatorics, graph theory, recursion)
- O 14. Mathematical structures (e.g., vector spaces, groups, rings, fields)
- O 15. Calculus
- O 16. Life Science (Please specify.) _____
- O 17. Physical science (Please specify.) _____
- O 18. Earth/space sciences
  - O a. Astronomy
  - O b. Oceanography
  - O c. Geology
  - O d. Meteorology
  - O e. Environmental science
- O 19. Engineering and design principles
- O 20. History of mathematics/science
- O 21. Mathematics/science as a way of knowing (e.g., inquiry, problem solving)

☐ **Mathematics/science concepts were not included as either an explicit focus or a vehicle for achieving other professional development purposes**

IV. Professional Development Activities

A. Were any of the instructional materials intended for classroom use as part of the LSC (e.g., FOSS; Insights; STC; SEPUP; Investigations in Number, Data, and Space; Connected Math; IMP; Core Plus) a focus of the professional development session?

- O No
- O Yes Please specify. _____

B. Indicate the *major*[5] *activities* of participants in this session. When choosing an "umbrella" category, be sure to indicate subcategories that apply as well. For example, if you mark "formal presentations," indicate by whom.

- O 1. Listened to a formal presentation by:
  - O a. Session presenter/facilitator
  - O b. Participant(s)
- O 2. Engaged in discussions/seminars/reporting out structured as:
  - O a. Entire group led by presenter/facilitator
  - O b. Entire group led by participant(s)
  - O c. Subsets of the group
- O 3. Engaged in problem solving/investigation focusing on disciplinary content, pedagogy, and/or reform issues
- O 4. Read about disciplinary content, pedagogy, or reform issues
- O 5. Wrote about disciplinary content, pedagogy, or reform issues

[5] "Major" means was used or addressed for a substantial portion of the session; if you were describing the session to someone, this feature would help characterize it.

C. Indicate the major professional development approaches used in this session.[6]

- O Workshop/institute/course/seminar
- O Receiving formal professional development via technology
- O Study groups/"kit clubs"/discussion groups/school-based meetings
- O Coaching/mentoring
- O Other: _____

D. Comments

Please provide any additional information you consider necessary to capture the activities or context of this professional development session. Include comments on any feature of the session that is so salient that you need to get it "on the table" right away to help explain your ratings.

SECTION TWO: RATINGS

In Section One of this form, you documented what occurred in the session. In this section, you are asked to use that information, as well as any other pertinent observations, to rate each of a number of key indicators in six different categories, from 1 (not at all) to 5 (to a great extent).

Note that any one session is not likely to provide evidence for every single indicator; use 6, "Don't know" when there is not enough evidence for you to make a judgment. Use 7, "N/A" (Not Applicable) when you consider the indicator inappropriate given the purpose and context of the session. For example, a session that focuses on engaging teachers in mathematics/science inquiry may choose not to address classroom applications. In that case, key indicator #8 under Category I (Design), "The design of the session provided opportunities for teachers to consider classroom applications of resources, strategies, and techniques," would be rated "N/A," rather than "not at all."

Similarly, there may be entire rating categories that are not applicable to a particular session. For example, categories III, IV, and V (Content) and Overall Ratings VIIA (Likely Impact on Participants' Capacity to Provide High Quality Mathematics/Science Education) and VIIB (Likely Impact on Participants' Leadership Capacity) each have a box to check when the entire rating category is judged to be inappropriate for the session[7]. Categories I (Design), II (Implementation), and VI (Culture of the Professional Development Session) are ones in which specific indicators may be "not applicable," but the overall category should routinely be rated for any observation.

Note that you may list any additional indicators you consider important in capturing the essence of this session and rate these as well.

Use your "Ratings of Key Indicators" (Part A) to inform your "Synthesis Ratings" (Part B). It is important to indicate in "Supporting Evidence for Synthesis Ratings" (Part C) what factors were most influential in determining your synthesis ratings and to give specific examples or quotes to illustrate those factors. Section Two concludes with ratings of the likely impact of professional development, and a capsule description of the session.

[6] Observers should refer to the Annotated Guide to the Professional Development Observation Protocol for descriptions of each of these professional development approaches.

[7] In most cases, the categories you rate will be consistent with the purposes marked in Section One. Part III.A.1 through 3.

I. Design

A. Ratings of Key Indicators

		Not at all				To a great extent	Don't know	N/A
1.	The design of the session incorporated tasks, roles, and interactions consistent with a spirit of investigation.	1	2	3	4	5	6	7
2.	The instructional strategies and activities used in this session reflected attention to participants' experience, preparedness, and/or learning styles.	1	2	3	4	5	6	7
3.	The session effectively built on participants' knowledge of content, teaching, learning, and/or the reform process.	1	2	3	4	5	6	7
4.	The strategies in this session were appropriate for accomplishing the purposes of the LSC professional development.	1	2	3	4	5	6	7
5.	The design of the session reflected careful planning and organization.	1	2	3	4	5	6	7
6.	The design of the session included "framing" the activity to help participants understand the purpose of the session and where it fits into the larger professional development picture.	1	2	3	4	5	6	7
7.	The design of the session encouraged a collaborative approach to learning.	1	2	3	4	5	6	7
8.	The design of the session provided opportunities for teachers to consider classroom applications of resources, strategies, and techniques.	1	2	3	4	5	6	7
9.	Adequate time and structure were provided for "sense-making," including reflection about concepts, strategies, issues, etc.	1	2	3	4	5	6	7
10.	Adequate time and structure were provided for participants to share experiences and insights.	1	2	3	4	5	6	7
11.	Adequate time and structure were provided for wrap-up and closure.	1	2	3	4	5	6	7
12.	_____	1	2	3	4	5		

B. Synthesis Rating

1	2	3	4	5
Design of the session not at all reflective of best practice for professional development.				Design of the session extremely reflective of best practice for professional development.

C. Supporting Evidence for Synthesis Rating

II. Implementation

A. Ratings of Key Indicators

	Not at all				To a great extent	Don't know	N/A
1. Formal presentation(s) included in the session were carried out effectively.	1	2	3	4	5	6	7
2. The facilitator(s)' contributions during the course of the session enhanced the quality of the session.	1	2	3	4	5	6	7
3. The facilitator(s) effectively modeled questioning strategies that are likely to enhance the development of conceptual understanding (e.g., emphasis on higher-order questions, appropriate use of "wait time," identifying prior conceptions and misconceptions.)	1	2	3	4	5	6	7
4. The facilitator(s)' background, experience, and/or expertise enhanced the quality of the session.	1	2	3	4	5	6	7
5. The facilitator(s)' management style enhanced the quality of the session.	1	2	3	4	5	6	7
6. The pace of the session was appropriate for the purposes of the professional development and the needs of adult learners.	1	2	3	4	5	6	7
7. The session modeled effective assessment strategies.	1	2	3	4	5	6	7
8. _____	1	2	3	4	5		

B. Synthesis Rating

1	2	3	4	5
Implementation of the session not at all reflective of best practice for professional development.				Implementation of the session extremely reflective of best practice for professional development

C. Supporting Evidence for Synthesis Rating

III. Mathematics/Science Content

Complete this category if: a) increasing mathematics/science content knowledge was a key purpose of the session; b) mathematics/science content was a vehicle for accomplishing other professional development purposes; or c) inadequate coverage in this area acted as a barrier to accomplishing other stated purposes of the session. If none of these apply, check here ☐ and skip to category IV.

A. Ratings of Key Indicators	Not at all				To a great extent	Don't know	N/A
1. Mathematics/science content was appropriate for the purposes of the professional development session and the backgrounds of the participants.	1	2	3	4	5	6	7
2. Mathematics/science content was sound and appropriately presented/explored.	1	2	3	4	5	6	7
3. Participants were intellectually engaged with important ideas relevant to the focus of the session.	1	2	3	4	5	6	7
4. Facilitator(s) displayed an understanding of mathematics/science concepts (e.g., in their dialogue with participants).	1	2	3	4	5	6	7
5. Mathematics/science was portrayed as a dynamic body of knowledge continually enriched by conjecture, investigation, analysis, and/or proof/justification.	1	2	3	4	5	6	7
6. Depth and breadth of attention to mathematics/science content was appropriate for the purposes of the session and participants' needs.	1	2	3	4	5	6	7
7. Elements of mathematical/scientific abstraction (e.g., symbolic representations, theory building) were included when it was important to do so.	1	2	3	4	5	6	7
8. Appropriate connections were made to other areas of mathematics/ science, to other disciplines, and/or to real-world contexts.	1	2	3	4	5	6	7
9. Extent of "sense-making" of mathematics/science content was appropriate for the purposes of the session and the needs of adult learners.	1	2	3	4	5	6	7
10. _____	1	2	3	4	5		

B. Synthesis Rating

1	2	3	4	5
Mathematics/science content of session not at all reflective of current standards for mathematics/science education				Mathematics/science content of session extremely reflective of current standards for mathematics/science education

C. Supporting Evidence for Synthesis Rating

IV. Exploring Pedagogy/Instructional Materials

Complete this category if: a) exploring classroom practice/instructional materials was a key purpose of the session; or b) lack of/inadequate coverage in this area acted as a barrier to accomplishing other stated purposes of the session. If neither of these apply, check here ☐ and skip to category V.

A. Ratings of Key Indicators	Not at all				To a great extent	Don't know	N/A
1. Depth and breadth of attention to student thinking/learning were appropriate for the purposes of the session and participants' needs.	1	2	3	4	5	6	7
2. Depth and breadth of attention to classroom strategies were appropriate for the purposes of the session and participants' needs.	1	2	3	4	5	6	7
3. Depth and breadth of attention to instructional materials intended for classroom use were appropriate for the purposes of the session and participants' needs.	1	2	3	4	5	6	7
4. Facilitator(s) displayed an understanding of pedagogical concepts (e.g., in their dialogue with participants).	1	2	3	4	5	6	7
5. Participants were intellectually engaged with important ideas relevant to classroom practice.	1	2	3	4	5	6	7
6. Extent of "sense-making" about classroom practice was appropriate for the purposes of the session and the needs of adult learners.	1	2	3	4	5	6	7
7. _____	1	2	3	4	5		

B. Synthesis Rating

1	2	3	4	5
Pedagogical content of session not at all reflective of current standards for mathematics/science education				Pedagogical content of session extremely reflective of current standards for mathematics/science education

C. Supporting Evidence for Synthesis Rating

V. Leadership Content

Complete this category only if exploring strategies/issues/roles of teacher leaders, principals, or others in leadership positions was a key purpose of the session. If not, check here ☐ and skip to category VI.

A. Ratings of Key Indicators	Not at all				To a great extent	Don't know	N/A
1. Information on principles of effective staff development was sound and appropriately presented/explored.	1	2	3	4	5	6	7
2. Information on strategies for mentoring/coaching peers was sound and appropriately presented/explored.	1	2	3	4	5	6	7
3. Information on how to be a reform advocate at the school/district level was sound and appropriately presented/explored.	1	2	3	4	5	6	7
4. Facilitator(s) displayed an understanding of leadership concepts (e.g., in their dialogue with participants).	1	2	3	4	5	6	7
5. Participants were intellectually engaged with important ideas relevant to the focus of the session.	1	2	3	4	5	6	7
6. Participants were given adequate and appropriate opportunity to consider how the content of the session applies to their particular leadership roles.	1	2	3	4	5	6	7
7. _____	1	2	3	4	5		

B. Synthesis Rating

1	2	3	4	5
Leadership content not at all appropriate for preparing participants to be school/district leaders of mathematics/science education				Leadership content highly appropriate for preparing participants to be school/district leaders of mathematics/science education

C. Supporting Evidence for Synthesis Rating

VI. Culture of the Professional Development Session

A1. Ratings of Key Indicators	Not at all				To a great extent	Don't know	N/A
1. Active participation of all was encouraged and valued.	1	2	3	4	5	6	7
2. There was a climate of respect for participants' experiences, ideas, and contributions.	1	2	3	4	5	6	7
3. Interactions reflected collaborative working relationships among participants.	1	2	3	4	5	6	7
4. Interactions reflected collaborative working relationships between facilitator(s) and participants.	1	2	3	4	5	6	7
5. Participants were encouraged to generate ideas, questions, conjectures, and propositions.	1	2	3	4	5	6	7
6. Participants demonstrated a willingness to share ideas and take intellectual risks.	1	2	3	4	5	6	7
7. Intellectual rigor, constructive criticism, and the challenging of ideas were evident.	1	2	3	4	5	6	7

A2. Respect for Diversity

Based on the culture of a professional development session, observers are generally able to make inferences about the extent to which there is an appreciation of diversity among participants (e.g., their gender, race/ethnicity, and/or cultural background). While direct evidence that reflects particular sensitivity or insensitivity toward diversity is not often observed, we would like you to document any examples you do see. If any examples were observed, please check here ☐ and describe below:

B. Synthesis Rating

1	2	3	4	5
Culture of the session interfered with engagement of participants as members of a professional learning community				Culture of the session facilitated engagement of participants as members of a professional learning community

C. Supporting Evidence for Synthesis Rating

VII. Overall Ratings of the Session

While the impact of a single professional development session may well be limited in scope, it is important to judge whether the session is likely to help move participants in the desired direction. For ratings in Sections A and B below, consider all available information (i.e., your previous ratings of design, implementation, content, and culture; related interviews; and your knowledge of the overall professional development program) as you assess the likely impact of this session. Feel free to elaborate on ratings with comments in the space provided.

A. Likely Impact on Participants' Capacity to Provide High Quality Mathematics/Science Education

Consider the likely impact of this session on the participants' capacity to provide high quality mathematics/science education. Select the response that best describes your overall assessment of the *likely effect* of this session in each of the following areas.

☐ Not applicable (The session did not focus on building capacity for classroom instruction.)

	Negative effect		Mixed or Neutral effect		Positive effect	Don't know	N/A
1. Participants' ability to identify and understand important ideas of mathematics/science.	O	O	O	O	O	O	O
2. Participants' understanding of mathematics/science as a dynamic body of knowledge generated and enriched by investigation.	O	O	O	O	O	O	O
3. Participants' understanding of how students learn.	O	O	O	O	O	O	O
4. Participants' ability to plan/provide high quality mathematics/ science classroom instruction.	O	O	O	O	O	O	O
5. Participants' ability to use the designated instructional materials to develop students' conceptual understanding.	O	O	O	O	O	O	O
6. Participants' self-confidence as mathematics/science instructors.	O	O	O	O	O	O	O
7. Professional networking among participants with regard to mathematics/science instruction.	O	O	O	O	O	O	O

Comments (optional):

B. Likely Impact on Participants' Leadership Capacity

If the session included any teacher leaders, principals, or others in leadership positions, consider the likely impact of this session on their leadership capacity. Select the response that best describes your overall assessment of the *likely effect* of this session in each of the following areas. Please note that even if an element was not addressed explicitly, it might have a negative or positive effect on leadership development, depending on whether it was modeled well or poorly.

☐ Not applicable (The session did not include teacher leaders, principals, or others in leadership positions.)

	Negative effect		Mixed or Neutral effect		Positive effect	Don't know	N/A
1. Leaders' knowledge and understanding of mathematics/science.	O	O	O	O	O	O	O
2. Leaders' knowledge and understanding of effective classroom practice.	O	O	O	O	O	O	O
3. Leaders' ability to convey to others a vision of effective mathematics/science classrooms.	O	O	O	O	O	O	O
4. Leaders' understanding of teachers' prior knowledge and areas where teachers have difficulty.	O	O	O	O	O	O	O
5. Leaders' understanding of adult learners.	O	O	O	O	O	O	O
6. Leaders' understanding of the reform process.	O	O	O	O	O	O	O
7. Leaders' understanding of important strategies for reform of mathematics/science education.	O	O	O	O	O	O	O
8. Leaders' ability to plan/implement exemplary professional development.	O	O	O	O	O	O	O
9. Leaders' confidence in serving in leadership roles.	O	O	O	O	O	O	O
10. Professional networking among leaders with regard to leadership issues.	O	O	O	O	O	O	O

Comments (optional):

C. Capsule Description of the Quality of the Professional Development Session

In this final rating of the session, consider all available information about the session, its context and purpose, and your own judgment of the relative importance of the ratings you have made. Select the capsule description that best characterizes the session you observed. Keep in mind that this rating is *not* intended to be an average of all the previous ratings, but should encapsulate your overall assessment of the quality and likely impact of the session. Please provide a brief rationale for your final capsule description of the session in the space provided.

O **Level 1: Ineffective Professional Development**
There is little or no evidence of participant thinking or engagement with important ideas of mathematics/science education. Session is *unlikely* to enhance the capacity of participants to provide high quality mathematics/science education or to be effective leaders of mathematics/science education in the district(s). Professional development appears to be either (select one below):

O **Passive "Learning"**
Session is pedantic and uninspiring. Participants are passive recipients of information; material is presented in a way that is inaccessible to or inappropriate for many of the participants.

O **Activity for Activity's Sake**
Participants are involved in hands-on activities or other individual or group work, but it appears to be activity for activity's sake. Session lacks a clear sense of purpose and/or a clear link to the conceptual development of participants.

O **Level 2: Elements of Effective Professional Development**
Session contains some elements of effective practice in professional development, but there are *substantial problems* in the design, content, and/or implementation given the purposes of the session. For example, the content is presented in a way that would reinforce misconceptions or the pace is clearly too rapid for meaningful participant engagement. Overall, the session is *quite limited* in its likelihood to enhance the capacity of most participants to provide high quality mathematics/science education or to be effective leaders of mathematics/science education in the district(s).

O **Level 3: Beginning Stages of Effective Professional Development** (Select one below.)
O Low 3 O Solid 3 O High 3
Professional development is purposeful and at times effective, but there are *some weaknesses* in the design, content, or implementation of the session. For example, participants' expertise is not well-utilized; or participants are not given sufficient opportunity to reflect on what they are learning. Overall, the session is *somewhat limited* in its likelihood to enhance the capacity of participants to provide high quality mathematics/science education or to be effective leaders of mathematics/science education in the district(s).

O **Level 4: Accomplished, Effective Professional Development**
Facilitation is skillful and participants are engaged in purposeful work (e.g., investigations, discussions, presentations, reading) designed to deepen their understanding of important mathematics/science concepts; enhance their pedagogical skills and knowledge; increase their ability to use the designated instructional materials; or to enhance their leadership skills. The facilitator(s) implement the professional development session well and participants' contributions are valued, but adaptation of content or format in response to participants' needs and interests may be somewhat limited. The session is *quite likely* to enhance the capacity of most participants to provide high quality mathematics/science education or to be effective leaders of mathematics/science education in the district(s).

O **Level 5: Exemplary Professional Development**
Facilitation is skillful, and participants are highly engaged in purposeful work (e.g., investigations, discussions, presentations, reading) designed to deepen their understanding of important mathematics/science concepts; enhance their pedagogical skills and knowledge; increase their ability to use the designated instructional materials; or to enhance their leadership skills. The session is artfully implemented, with flexibility and responsiveness to participant needs/interests. The session is *highly likely* to enhance the capacity of participants to provide high quality mathematics/science education or to be effective leaders of mathematics/science education in the district(s).

Please provide your rationale for the capsule rating:

1999–2000 Local Systemic Change
Teacher Interview[1]

1. What grade(s) do you teach?

2. This district is involved in an NSF-supported local systemic change initiative.[2]

   To what extent have you participated in those activities (e.g., number of hours/days since becoming involved in the project)?[3]

   PROBE for both summer and academic year activities.

3. How do you feel about the professional development provided by the LSC?

4. How has the LSC affected you and your teaching?

   PROBE for examples of changes.

5. What specific characteristics of the LSC have been most helpful to you?

6. What aspects have been least helpful? Why?

7. What else do you need in order to continue improving your mathematics (science) instruction?

8. Sometimes school and district policies and practices facilitate reform. At other times they get in the way. Are there any policies or practices in your school or district that you believe will help you in making the changes suggested by the LSC?

9. Are there any policies or practices that you believe will limit your ability to make the changes suggested by the LSC?

---

[1] This protocol should be used for teacher interviews in all projects, except those in the Baseline Year or Final Year.

[2] You may want to use the local name for the LSC instead of, or in addition to, mentioning NSF, perhaps even giving examples of specific activities.

[3] Only treated teachers who have participated in 20 or more hours of professional development have been included in the random sample for teacher interviews.

For teachers who have participated in LSC leadership development:
(If teacher has not participated in LSC leadership development, SKIP to Question 11.)

10. To what extent have the professional development activities prepared you for your role as a teacher leader of mathematics (science) reform in your school or district?

    PROBE for specific examples of preparedness.

11. Do you have any other comments you would like to share?

Form Approval OMB No: 3145-0136 Expires: August 2001

Local Systemic Change *through* Teacher Enhancement

2000 Teacher Questionnaire

Mathematics (Grades K-8)

For office use only

~ place label here ~

DesignExpert™ by NCS Printed in U.S.A. Mark Reflex® EW-210693-1:654331 HR06

PLEASE DO NOT WRITE IN THIS AREA

Instructions: Please use a #2 pencil to complete this questionnaire. Darken ovals completely, but do not stray into adjacent ovals. Be sure to erase completely any stray marks.

A. Teacher Demographic Information

1. Are you:

   - ⬭ Male
   - ⬭ Female

2. Race - Are you: (Darken one or more.)

   - ⬭ American Indian or Alaskan Native
   - ⬭ Asian
   - ⬭ Black or African-American
   - ⬭ Hispanic or Latino
   - ⬭ Native Hawaiian or Other Pacific Islander
   - ⬭ White

3. How many college mathematics courses have you completed? (Darken one oval.)

   - ⬭ None
   - ⬭ 1 semester
   - ⬭ 2 semesters
   - ⬭ 3 semesters
   - ⬭ 4 semesters
   - ⬭ 5 or more semesters

4. Did your college mathematics coursework include the equivalent of at least one semester of: (Darken one oval on each line.)

		Yes	No
a.	Number system concepts	⬭	⬭
b.	Concepts in algebra	⬭	⬭
c.	Concepts in geometry	⬭	⬭

5. How many years have you taught prior to this school year? (Darken one oval.)

0-2	3-5	6-10	11-15	16-20	21-25	26 or more
⬭	⬭	⬭	⬭	⬭	⬭	⬭

The National Science Foundation's Local Systemic Change (LSC) through Teacher Enhancement Program's Core Evaluation

You have been selected to participate in the nationwide evaluation of the federally-funded Local Systemic Change (LSC) program. LSC is a National Science Foundation Teacher Enhancement program that is currently funding more than 50 local projects that offer science and mathematics professional development to teachers around the country. **The cover letter accompanying this questionnaire identifies the LSC project in your area, as well as the instructional materials that are the focus of that LSC project.**

Several times over the course of the LSC, each project will administer questionnaires to a sample of teachers who are targeted to participate in the local project's professional development activities. Note that you may be asked to complete this questionnaire even if you have not yet participated in the project's professional development; your response is important, regardless of whether you have already participated. A small number of randomly-selected teachers in each project is asked to provide additional information in interviews, sometimes in conjunction with a classroom visit. In order to continue receiving federal funding, each LSC project must participate in this national evaluation.

Data collection procedures have been developed to ensure high-quality data and protect teacher confidentiality. Your responses will be kept strictly confidential; they will be combined with the responses of the other teachers in your project and used only for the LSC evaluation. The name label and numbering on this questionnaire are used to help local projects deliver questionnaires to the proper teachers and follow up with teachers who have not responded; no information identifying individual teachers will be reported under any circumstances. After you complete the questionnaire, you should remove the name label and return the questionnaire as specified by your local LSC project. Additional information about privacy, as well as public burden, is provided on page 7 of this questionnaire.

BEST COPY AVAILABLE

B. Teacher Opinions and Preparedness

6. Please provide your opinion about each of the following statements. (Darken one oval on each line.)

	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
a. Students generally learn mathematics best in classes with students of similar abilities.	①	②	③	④	⑤
b. I feel supported by colleagues to try out new ideas in teaching mathematics.	①	②	③	④	⑤
c. Teachers in this school have a shared vision of effective mathematics instruction.	①	②	③	④	⑤
d. Teachers in this school regularly share ideas and materials related to mathematics.	①	②	③	④	⑤
e. Teachers in this school are well-supplied with materials for investigative mathematics instruction.	①	②	③	④	⑤
f. I have time during the regular school week to work with my peers on mathematics curriculum and instruction.	①	②	③	④	⑤
g. I have adequate access to calculators for teaching mathematics.	①	②	③	④	⑤
h. I have adequate access to computers for teaching mathematics.	①	②	③	④	⑤
i. I enjoy teaching mathematics.	①	②	③	④	⑤
j. I am well-informed about the NCTM *Standards* for the grades I teach.	①	②	③	④	⑤
k. The mathematics program in this school is strongly supported by local organizations, institutions and/or businesses.	①	②	③	④	⑤

7. In the left section, please rate each of the following in terms of its **importance** for effective mathematics instruction in the grades you teach. In the right section, please indicate how **prepared** you feel to do each one. (Darken one oval in each section on each line.)

	Importance				Preparation			
	Not Important	Somewhat Important	Fairly Important	Very Important	Not Adequately Prepared	Somewhat Prepared	Fairly Well Prepared	Very Well Prepared
a. Provide concrete experience before abstract concepts.	①	②	③	④	①	②	③	④
b. Develop students' conceptual understanding of mathematics.	①	②	③	④	①	②	③	④
c. Take students' prior understanding into account when planning curriculum and instruction.	①	②	③	④	①	②	③	④
d. Practice computational skills and algorithms.	①	②	③	④	①	②	③	④
e. Make connections between mathematics and other disciplines.	①	②	③	④	①	②	③	④
f. Have students work in cooperative learning groups.	①	②	③	④	①	②	③	④
g. Have students participate in appropriate hands-on activities.	①	②	③	④	①	②	③	④
h. Engage students in inquiry-oriented activities.	①	②	③	④	①	②	③	④
i. Use calculators.	①	②	③	④	①	②	③	④
j. Use computers.	①	②	③	④	①	②	③	④
k. Engage students in applications of mathematics in a variety of contexts.	①	②	③	④	①	②	③	④
l. Use performance-based assessment.	①	②	③	④	①	②	③	④
m. Use portfolios.	①	②	③	④	①	②	③	④
n. Use informal questioning to assess student understanding.	①	②	③	④	①	②	③	④

PLEASE DO NOT WRITE IN THIS AREA

82

8. My principal: (Darken one oval on each line.)

	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
a. Encourages me to select mathematics content and instructional strategies that address individual students' learning.	①	②	③	④	⑤
b. Accepts the noise that comes with an active classroom.	①	②	③	④	⑤
c. Encourages the implementation of current national standards in mathematics education.	①	②	③	④	⑤
d. Encourages innovative instructional practices.	①	②	③	④	⑤
e. Enhances the mathematics program by providing me with needed materials and equipment.	①	②	③	④	⑤
f. Provides time for teachers to meet and share ideas with one another.	①	②	③	④	⑤
g. Encourages me to observe exemplary mathematics teachers.	①	②	③	④	⑤
h. Encourages teachers to make connections across disciplines.	①	②	③	④	⑤
i. Acts as a buffer between teachers and external pressures (e.g., parents).	①	②	③	④	⑤

9. Many teachers feel better prepared to teach some subject areas than others. How well prepared do you feel to teach each of the following subjects at the grade levels you teach, whether or not they are currently included in your curriculum? (Darken one oval on each line.)

	Not Adequately Prepared	Somewhat Prepared	Fairly Well Prepared	Very Well Prepared
a. Science	①	②	③	④
b. Mathematics	①	②	③	④
c. Reading/Language Arts	①	②	③	④
d. Social Studies	①	②	③	④

10. Within mathematics, many teachers feel better prepared to teach some topics than others. How well prepared do you feel to teach each of the following topics at the grade levels you teach, whether or not they are currently included in your curriculum? (Darken one oval on each line.)

	Not Adequately Prepared	Somewhat Prepared	Fairly Well Prepared	Very Well Prepared
a. Numeration and number theory	①	②	③	④
b. Computation	①	②	③	④
c. Estimation	①	②	③	④
d. Measurement	①	②	③	④
e. Pre-algebra	①	②	③	④
f. Algebra	①	②	③	④
g. Patterns and relationships	①	②	③	④
h. Geometry and spatial sense	①	②	③	④
i. Data collection and analysis	①	②	③	④
j. Probability	①	②	③	④
k. Technology (calculators, computers) in support of mathematics	①	②	③	④

11. Within the arena of mathematical processes, many teachers feel better prepared to guide and help develop student learning in some domains than others. How well prepared do you feel to provide guidance in the following, at the grade levels you teach? (Darken one oval on each line.)

	Not Adequately Prepared	Somewhat Prepared	Fairly Well Prepared	Very Well Prepared
a. Problem solving	①	②	③	④
b. Reasoning and proof	①	②	③	④
c. Communication (written and oral)	①	②	③	④
d. Connections within mathematics and from mathematics to other disciplines	①	②	③	④
e. Multiple representations (e.g., concrete models, and numeric, graphical, symbolic, and geometric representations)	①	②	③	④

BEST COPY AVAILABLE

12. Please indicate how well prepared you feel to do each of the following. (Darken one oval on each line.)

	Not Adequately Prepared	Somewhat Prepared	Fairly Well Prepared	Very Well Prepared
a. Lead a class of students using investigative strategies.	①	②	③	④
b. Manage a class of students engaged in hands-on/project-based work.	①	②	③	④
c. Help students take responsibility for their own learning.	①	②	③	④
d. Recognize and respond to student diversity.	①	②	③	④
e. Encourage students' interest in mathematics.	①	②	③	④
f. Use strategies that specifically encourage participation of females and minorities in mathematics.	①	②	③	④
g. Involve parents in the mathematics education of their students.	①	②	③	④

13. Please rate the effect of each of the following on your mathematics instruction. (Darken one oval on each line.)

	Inhibits Effective Instruction		Neutral or Mixed		Encourages Effective Instruction	N/A / Don't Know
a. State and/or district curriculum frameworks.	①	②	③	④	⑤	N/A
b. State and/or district testing policies and practices.	①	②	③	④	⑤	N/A
c. Quality of available instructional materials.	①	②	③	④	⑤	N/A
d. Access to calculators for mathematics instruction.	①	②	③	④	⑤	N/A
e. Access to computers for mathematics instruction.	①	②	③	④	⑤	N/A
f. Funds for purchasing equipment and supplies for mathematics.	①	②	③	④	⑤	N/A
g. System of managing instructional resources at the district or school level.	①	②	③	④	⑤	N/A
h. Time available for teachers to plan and prepare lessons.	①	②	③	④	⑤	N/A
i. Time available for teachers to work with other teachers.	①	②	③	④	⑤	N/A
j. Time available for teacher professional development.	①	②	③	④	⑤	N/A
k. Importance that the school places on mathematics.	①	②	③	④	⑤	N/A
l. Consistency of mathematics reform efforts with other school/district reforms.	①	②	③	④	⑤	N/A
m. Public attitudes toward reform.	①	②	③	④	⑤	N/A

14. How many of your students' parents do each of the following? (Darken one oval on each line.)

	None	A Few		About 1/2		Almost All
a. Volunteer to assist with class activities.	⓪	①	②	③	④	⑤
b. Donate money or materials for classroom instruction.	⓪	①	②	③	④	⑤
c. Attend parent-teacher conferences.	⓪	①	②	③	④	⑤
d. Attend school activities such as PTA meetings and Family Mathematics nights.	⓪	①	②	③	④	⑤
e. Voice support for the use of an investigative approach to mathematics instruction.	⓪	①	②	③	④	⑤
f. Voice support for traditional approaches to mathematics instruction.	⓪	①	②	③	④	⑤

C. Your Mathematics Teaching

Questions 15-21 ask about your mathematics teaching. Please answer for your first elementary/middle school mathematics class of the day.

15. What grade level is this class? (Darken all ovals that apply.)

K	1	2	3	4	5	6	7	8
(K)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

16. Do you teach in a self-contained classroom (i.e., you are responsible for teaching several subjects to one class)? (Darken one oval.)

○ Yes ○ No (**Skip to Question 20**)

17. How many lessons per week do you typically teach mathematics to this class? (Darken one oval.)

Number of Lessons

0	1	2	3	4	5
(0)	(1)	(2)	(3)	(4)	(5)

18. Approximately how many minutes is a typical mathematics lesson? (Darken one oval.)

Average Number of Minutes per Lesson

10 or fewer	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81 or more
○	○	○	○	○	○	○	○	○

19. In how many of the last five school days did you teach each of the following in this class? (Darken one oval on each line.)

	Number of Days					
	None	One	Two	Three	Four	Five
a. Science	(0)	(1)	(2)	(3)	(4)	(5)
b. Mathematics	(0)	(1)	(2)	(3)	(4)	(5)
c. Reading/Language Arts	(0)	(1)	(2)	(3)	(4)	(5)
d. Social Studies	(0)	(1)	(2)	(3)	(4)	(5)

20. About how often do **you** do each of the following in your mathematics instruction in this class? (Darken one oval on each line.)

	Never	Rarely (e.g., a few times a year)	Sometimes (e.g., once or twice a month)	Often (e.g., once or twice a week)	All or almost all mathematics lessons
a. Use the LSC-designated instructional materials (see cover letter) as the basis of mathematics lessons.	(1)	(2)	(3)	(4)	(5)
b. Introduce content through formal presentations.	(1)	(2)	(3)	(4)	(5)
c. Arrange seating to facilitate student discussion.	(1)	(2)	(3)	(4)	(5)
d. Use open-ended questions.	(1)	(2)	(3)	(4)	(5)
e. Require students to explain their reasoning when giving an answer.	(1)	(2)	(3)	(4)	(5)
f. Encourage students to communicate mathematically.	(1)	(2)	(3)	(4)	(5)
g. Encourage students to explore alternative methods for solutions.	(1)	(2)	(3)	(4)	(5)
h. Encourage students to use multiple representations (e.g., numeric, graphic, geometric, etc.).	(1)	(2)	(3)	(4)	(5)
i. Allow students to work at their own pace.	(1)	(2)	(3)	(4)	(5)
j. Help students see connections between mathematics and other disciplines.	(1)	(2)	(3)	(4)	(5)
k. Use assessment to find out what students know before or during a unit.	(1)	(2)	(3)	(4)	(5)
l. Embed assessment in regular class activities.	(1)	(2)	(3)	(4)	(5)
m. Assign mathematics homework.	(1)	(2)	(3)	(4)	(5)
n. Read and comment on the reflections students have written in their notebooks or journals.	(1)	(2)	(3)	(4)	(5)

BEST COPY AVAILABLE

21. About how often do **students** in this class take part in each of the following types of activities as part of their mathematics instruction? (Darken one oval on each line.)

	Never	Rarely (e.g., a few times a year)	Sometimes (e.g., once or twice a month)	Often (e.g., once or twice a week)	All or almost all mathematic lessons
a. Participate in student-led discussions.	①	②	③	④	⑤
b. Participate in discussions with the teacher to further mathematical understanding.	①	②	③	④	⑤
c. Work in cooperative learning groups.	①	②	③	④	⑤
d. Make formal presentations to the class.	①	②	③	④	⑤
e. Read from a mathematics textbook in class.	①	②	③	④	⑤
f. Read other (non-textbook) mathematics-related materials in class.	①	②	③	④	⑤
g. Practice routine computations/algorithms.	①	②	③	④	⑤
h. Review homework/worksheet assignments.	①	②	③	④	⑤
i. Use mathematical concepts to interpret and solve word problems.	①	②	③	④	⑤
j. Work on solving a real-world problem.	①	②	③	④	⑤
k. Share ideas or solve problems with each other in small groups.	①	②	③	④	⑤
l. Engage in hands-on mathematical activities.	①	②	③	④	⑤
m. Play mathematics games.	①	②	③	④	⑤
n. Follow specific instructions in an activity or investigation.	①	②	③	④	⑤
o. Design or implement their *own* investigation.	①	②	③	④	⑤
p. Work on models or simulations.	①	②	③	④	⑤
q. Work on extended mathematics investigations or projects (a week or more in duration).	①	②	③	④	⑤
r. Participate in field work.	①	②	③	④	⑤
s. Record, represent and/or analyze data.	①	②	③	④	⑤
t. Write a description of a plan, procedure or problem-solving process.	①	②	③	④	⑤
u. Write reflections in a notebook or journal.	①	②	③	④	⑤
v. Use calculators or computers for learning or practicing skills.	①	②	③	④	⑤
w. Use calculators or computers to develop conceptual understanding.	①	②	③	④	⑤
x. Use calculators or computers as a tool (e.g., spreadsheets, data analysis).	①	②	③	④	⑤
y. Work on portfolios.	①	②	③	④	⑤
z. Take short-answer tests (e.g., multiple choice, true/false, fill-in-the-blank).	①	②	③	④	⑤
aa. Take tests requiring open-ended responses (e.g., descriptions, justifications of solutions).	①	②	③	④	⑤
bb. Engage in performance tasks for assessment purposes.	①	②	③	④	⑤

D. LSC Professional Development

Questions 22-27 refer to the NSF-supported Local Systemic Change (LSC) program. Please refer to the cover letter accompanying this questionnaire for information about the LSC project activities and designated materials in your district. If you have not yet participated in LSC professional development, darken this oval ○ and skip to Question 27.

22. To what extent is each of the following true of LSC mathematics-related professional development in your district? (Darken one oval on each line.)

	Not at all				To a great exte
a. I am involved in planning my mathematics-related professional development.	①	②	③	④	⑤
b. I am encouraged to develop an individual professional development plan to address my needs and interests related to mathematics education.	①	②	③	④	⑤
c. I am given time to work with other teachers as part of my professional development.	①	②	③	④	⑤
d. I am given time to reflect on what I've learned and how to apply it to the classroom.	①	②	③	④	⑤
e. I receive support as I try to implement what I've learned.	①	②	③	④	⑤

23. Approximately how many ***total hours*** have you spent on formal professional development in mathematics/mathematics education as part of the LSC ***since the project began***? (Darken one oval.)

○ 0	○ 10-19	○ 40-59	○ 80-99	○ 130-159	○ 200 or greater
○ 1-9	○ 20-39	○ 60-79	○ 100-129	○ 160-199	

24. Please indicate the number of times you have participated in each of the following activities **during this school year**. (Darken one oval on each line.)

	0	1-2	3-4	5-6	7 or more
a. Participated in an LSC academic year study group/discussion group.	①	②	③	④	⑤
b. Was "coached" on my teaching by an LSC lead teacher/staff person based on a classroom observation.	①	②	③	④	⑤
c. Received assistance from an LSC "lead teacher" in my school.	①	②	③	④	⑤
d. Received assistance from an LSC staff person in my district.	①	②	③	④	⑤
e. Received assistance from an LSC-designated mathematician/mathematics educator from a college/university/museum/industry.	①	②	③	④	⑤
f. Read messages in a Listserv discussion sponsored by the LSC.	①	②	③	④	⑤
g. Posted messages to a Listserv discussion sponsored by the LSC.	①	②	③	④	⑤

25. How would you rate the overall quality of the LSC professional development? (Darken one oval.)

Very Poor	Poor	Fair	Good	Very Good	Excellent
○	○	○	○	○	○

26. To what extent has participation in LSC mathematics-related professional development increased your: (Darken one oval on each line.)

	Not at all				To a great extent
a. Mathematics content knowledge.	①	②	③	④	⑤
b. Understanding of how children think about/learn mathematics.	①	②	③	④	⑤
c. Ability to implement high-quality mathematics instructional materials.	①	②	③	④	⑤

27. Have you been identified as a lead teacher for your district's NSF-sponsored LSC project? ○ Yes ○ No

Thank you very much for participating in this survey!

Privacy Act and Public Burden Statements The information requested on this survey is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information from this data collection will be retained as part of the Privacy Act System of Records in accordance with the Privacy Act of 1974. Data submitted will be used in accordance with the criteria established by NSF for monitoring research and education grants, and in response to Public Law 99-383 and 24 USC 1885c. The information requested may be disclosed to qualified researchers and contractors in order to coordinate programs and to a Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information may be added to and maintained by the Education and Training System of Records 63 Federal Register 264, 272 (January 5, 1998).

Public reporting burden for this collection of information is estimated to average 20 minutes per response, including the time for reviewing instructions. Send comments regarding this burden estimate, or any other aspect of this collection of information, including suggestions for reducing this burden, to Suzanne Plimpton, Reports Clearance Officer, Systems and Services Branch, Division of Administrative Services, National Science Foundation, 4201 Wilson Blvd., Arlington, VA 22230. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB number for this survey is 3145-0136.

2000 Local Systemic Change
Principal Questionnaire

Form Approval
OMB No: 3145-013
Expires: August 200

Instructions: Please use a #2 pencil to complete this questionnaire. Darken ovals completely, but do not stray into adjacent ovals. Be sure to erase completely any stray marks.

A. Mathematics and Science Instruction

1. Please provide your opinion about each of the following statements regarding mathematics and science instruction. (Darken one oval in each section on each line.)

	Mathematics					Science				
	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree	Strongly Disagree	Disagree	No Opinion	Agree	Stron Agr
a. Students generally learn best in classes with students of similar abilities.	①	②	③	④	⑤	①	②	③	④	⑤
b. I am knowledgeable about current national standards in this content area.	①	②	③	④	⑤	①	②	③	④	⑤
c. I feel well-prepared to support teachers in the implementation of current national standards.	①	②	③	④	⑤	①	②	③	④	⑤
d. I am willing to accept the noise that comes with an active classroom.	①	②	③	④	⑤	①	②	③	④	⑤
e. Encouraging student questions is more important than eliciting correct answers.	①	②	③	④	⑤	①	②	③	④	⑤

2. Please provide your opinion about each of the following statements. (Darken one oval on each line.)

	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
a. Vocational/technology education should have a strong mathematics and science component.	①	②	③	④	⑤
b. Students who are not interested in science/mathematics/technology careers should be able to opt out of mathematics and science courses after the 10th or 11th grade.	①	②	③	④	⑤
c. Schools need to provide students who are not interested in science/mathematics/technology careers course options in mathematics and science for all of their high school years.	①	②	③	④	⑤
d. Specialized courses in mathematics and science should be available for college-bound students.	①	②	③	④	⑤

3. How would you describe your school's progress in moving toward excellence in mathematics and science education? (Darken one oval on each line.)

	Quite far from ideal		Beginning to improve		Well along in improving		Approaching ideal
a. Mathematics program	①	②	③	④	⑤	⑥	⑦
b. Science program	①	②	③	④	⑤	⑥	⑦

4. Compared to 5 years ago, which best describes the achievement of students in this school? (Darken one oval on each line.)

	Much worse	Somewhat worse	About the same	Somewhat improved	Much improved
a. Mathematics	①	②	③	④	⑤
b. Science	①	②	③	④	⑤

PLEASE DO NOT WRITE IN THIS AREA

5. Please rate each of the following in terms of its importance for effective mathematics and science instruction. (Darken one oval in each section on each line.)

	Mathematics				Science			
	Not Important	Somewhat Important	Fairly Important	Very Important	Not Important	Somewhat Important	Fairly Important	Very Important
a. Provide concrete experience before abstract concepts.	①	②	③	④	①	②	③	④
b. Develop students' conceptual understanding of the subject.	①	②	③	④	①	②	③	④
c. Take students' prior understanding of subject matter into account when planning curriculum and instruction.	①	②	③	④	①	②	③	④
d. Make connections to other disciplines.	①	②	③	④	①	②	③	④
e. Have students work in cooperative learning groups.	①	②	③	④	①	②	③	④
f. Have students participate in appropriate hands-on activities.	①	②	③	④	①	②	③	④
g. Engage students in inquiry-oriented activities.	①	②	③	④	①	②	③	④
h. Use calculators.	①	②	③	④	①	②	③	④
i. Use computers.	①	②	③	④	①	②	③	④
j. Engage students in applications of subject matter in a variety of contexts.	①	②	③	④	①	②	③	④
k. Use performance-based assessment.	①	②	③	④	①	②	③	④
l. Use portfolios.	①	②	③	④	①	②	③	④
m. Use informal questioning to assess student understanding.	①	②	③	④	①	②	③	④

6. Please rate the effect of each of the following on *mathematics* instruction in your school. (Darken one oval on each line.)

	Inhibits effective instruction		Neutral or mixed		Encourages effective instruction	N/A Don't Know
a. State and/or district curriculum frameworks.	①	②	③	④	⑤	⓪
b. State and/or district testing policies and practices.	①	②	③	④	⑤	⓪
c. District/school grading policies and practices.	①	②	③	④	⑤	⓪
d. District/school structures for recognizing and rewarding teachers.	①	②	③	④	⑤	⓪
e. Counseling department policies and practices.	①	②	③	④	⑤	⓪
f. College placement tests.	①	②	③	④	⑤	⓪
g. Quality of available instructional materials.	①	②	③	④	⑤	⓪
h. Access to calculators for mathematics instruction.	①	②	③	④	⑤	⓪
i. Access to computers for mathematics instruction.	①	②	③	④	⑤	⓪
j. Funds for purchasing equipment and supplies for mathematics.	①	②	③	④	⑤	⓪
k. System of managing instructional resources at the district or school level.	①	②	③	④	⑤	⓪
l. Time available for teachers to plan and prepare lessons.	①	②	③	④	⑤	⓪
m. Time available for teachers to work with other teachers.	①	②	③	④	⑤	⓪
n. Time available for teacher professional development.	①	②	③	④	⑤	⓪
o. Importance that the school places on mathematics.	①	②	③	④	⑤	⓪
p. Consistency of mathematics reform efforts with other school/district reforms.	①	②	③	④	⑤	⓪
q. Public attitudes toward reform.	①	②	③	④	⑤	⓪

BEST COPY AVAILABLE

7. Please rate the effect of each of the following on *science* instruction in your school. (Darken one oval on each line.)

	Inhibits effective instruction		Neutral or mixed		Encourages effective instruction	N/A Don't Know
a. State and/or district curriculum frameworks.	①	②	③	④	⑤	ⓝ
b. State and/or district testing policies and practices.	①	②	③	④	⑤	ⓝ
c. District/school grading policies and practices.	①	②	③	④	⑤	ⓝ
d. District/school structures for recognizing and rewarding teachers.	①	②	③	④	⑤	ⓝ
e. Counseling department policies and practices.	①	②	③	④	⑤	ⓝ
f. College placement tests.	①	②	③	④	⑤	ⓝ
g. Quality of available instructional materials.	①	②	③	④	⑤	ⓝ
h. Access to calculators for science instruction.	①	②	③	④	⑤	ⓝ
i. Access to computers for science instruction.	①	②	③	④	⑤	ⓝ
j. Funds for purchasing equipment and supplies for science.	①	②	③	④	⑤	ⓝ
k. System of managing instructional resources at the district or school level.	①	②	③	④	⑤	ⓝ
l. Time available for teachers to plan and prepare lessons.	①	②	③	④	⑤	ⓝ
m. Time available for teachers to work with other teachers.	①	②	③	④	⑤	ⓝ
n. Time available for teacher professional development.	①	②	③	④	⑤	ⓝ
o. Importance that the school places on science.	①	②	③	④	⑤	ⓝ
p. Consistency of science reform efforts with other school/district reforms.	①	②	③	④	⑤	ⓝ
q. Public attitudes toward reform.	①	②	③	④	⑤	ⓝ

Questions 8-9 refer to the NSF-supported Local Systemic Change (LSC) program. Please refer to the cover letter accompanying this questionnaire for information about the LSC project activities and designated materials in your district.

8. To what extent: (Darken one oval on each line.)

	Not at all				To a great extent	N/A Don't Know
a. Are you familiar with the LSC project in your district?	①	②	③	④	⑤	ⓝ
b. Have you been involved in LSC project activities?	①	②	③	④	⑤	ⓝ
c. Have parents voiced support for the LSC approach in the classroom?	①	②	③	④	⑤	ⓝ
d. Have parents voiced opposition to the LSC approach in the classroom?	①	②	③	④	⑤	ⓝ

9. *Considering only teachers responsible for teaching the subject(s) targeted by the LSC*, approximately what percent of the teachers in your school: (Darken one oval on each line.)

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
a. Have been involved in LSC professional development activities?	○	○	○	○	○	○	○	○	○	○	○
b. Are implementing at least some of the LSC-designated instructional materials?	○	○	○	○	○	○	○	○	○	○	○

B. Principal Information

10. Including this year, how many years have you been: (Darken one oval on each line.)

	1	2	3	4	5	6-10	11-15	16-20	21-25	More than 25
a. A principal?	○	○	○	○	○	○	○	○	○	○
b. The principal at this school?	○	○	○	○	○	○	○	○	○	○
c. A principal in this school district?	○	○	○	○	○	○	○	○	○	○

C. School Characteristics

~ *place label here* ~

11. How many students attend your school? (Please enter your response as a four- digit number and then darken the appropriate oval in each column. For example, enter 850 students as 0850.)

				students
0	0	0	0	
1	1	1	1	
2	2	2	2	
3	3	3	3	
4	4	4	4	
5	5	5	5	
6	6	6	6	
7	7	7	7	
8	8	8	8	
9	9	9	9	

12. In what type of community is this school located? (Darken one oval.)

- ○ Rural
- ○ Town or Small City
- ○ Suburban
- ○ Urban

13. This school includes the following grades: (Darken all that apply.)

K	1	2	3	4	5	6	7	8	9	10	11	12
○	○	○	○	○	○	○	○	○	○	○	○	○

14. What is the estimated percentage of students in this school with limited English proficiency?

			%
0	0	0	
1	1	1	
	2	2	
	3	3	
	4	4	
	5	5	
	6	6	
	7	7	
	8	8	
	9	9	

15. What percentage of the students in this school are eligible for free or reduced-price lunches that are paid for with public funds?

			%
0	0	0	
1	1	1	
	2	2	
	3	3	
	4	4	
	5	5	
	6	6	
	7	7	
	8	8	
	9	9	

For office use only

	0	0	0	0	0	0	0
	1	1	1	1	1	1	1
	2	2	2	2	2	2	2
	3	3	3	3	3	3	3
	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
	6	6	6	6	6	6	6
	7	7	7	7	7	7	7
	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9

DesignExpert™ by NCS Printed in U.S.A. Mark Reflex® EW-204972-2:854321 HR06

PLEASE DO NOT WRITE IN THIS AREA

Austin Independent School District

Division of Accountability and Information Systems
Joy McLarty, Ph.D.

Department of Accountability
Maria Whitsett, Ph.D.

Office of Program Evaluation
Holly Williams, Ph.D.

Author
Michelle Batchelder, Ph.D.

Programmer
Veda Raju

Board of Trustees
Kathy Rider, President
Doyle Valdez, Vice President
Loretta Edelen, Secretary
Johna Edwards
Olga Garza
Rudy Montoya
Ingrid Taylor
Ave Wahrmund
Patricia Whiteside

Superintendent of Schools
Pascal D. Forgione, Jr., Ph.D.

Publication Number 99.14
January 2001